Cultural Resource Investigation of Lands Affected by a Flood Control Project at Chaska, Minnesota, along the Minnesota River
January 1981
Contract DACW 37-80-C-0064

Principal Investigator: Elden Johnson

Submitted to: St. Paul District, U.S. Army Corps of Engineers

ARCHAEOLOGY REPORTS

Wilford Archaeology Laboratory
University of Minnesota

DEPARTMENT OF ANTHROPOLOGY
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A literature search, records review, and reconnaissance or Phase I field survey was conducted by a University of Minnesota research team in the area of a proposed flood project in Chaska, Minnesota, on the lower Minnesota River.

The literature search and records review included the entire Chaska area and its environs and while that search did not disclose any prehistoric or historic sites or places in the specific project area surveyed here, it did produce a number of potential and actual National Register sites and places in

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The field testing was confined to the West Chaska Creek diversion, the portion of Alternate 2 lying at an elevation above the river flood plain, and the portion of Alternate 3 lying at an elevation above the river flood plain. Field testing consisted of a visual surface examination of the three right-of-ways followed by shovel testing of right-of-way segments not already impacted and where land owner permission was obtained.

The field shovel testing was negative. No prehistoric materials were located in the test areas. No further work is recommended for the project areas covered in this report.

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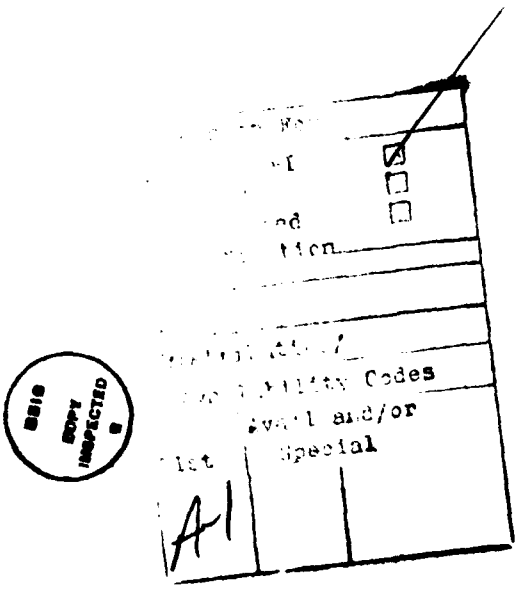

Administrative Summary

A literature search, records review, and reconnaissance or Phase I field survey was conducted by a University of Minnesota research team in the area of a proposed flood project in Chaska, Minnesota, on the lower Minnesota River.

The literature search and records review included the entire Chaska area and its environs and while that search did not disclose any prehistoric or historic sites or places in the specific project area surveyed here, it did produce a number of potential and actual National Register sites and places in Chaska according to the records of the State Prehistoric Office in September 1980. The comprehensive literature search and records review done here should be adequate for any additional Phase I field testing on other segments of the Chaska flood control project.

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1. Introduction

A literature search, records review, and Phase I or reconnaissance survey of the area affected by a project for flood control at Chaska, Minnesota, was undertaken by the University of Minnesota for the St. Paul District, U.S. Army Corps of Engineers during the period September through November, 1980. This work was done under contract DACW 37-80-C-0064 by the Principal Investigator, Elden Johnson, Professor and Chair, Department of Anthropology, University of Minnesota, assisted by graduate students Clark Dobbs, William Yord, and Robert Vogel. The purpose of these activities was to locate and identify cultural resources susceptible to impact by the proposed flood control construction project.

The project area is in and adjacent to the city of Chaska, Minnesota, which lies approximately 25 miles upstream on the Minnesota River above its junction with the Mississippi River. The city of Chaska is in Carver County, Minnesota and is built partially on the Minnesota River flood plain. Its location is shown on map 1. and the entire project area is included on the Shakopee Quadrangle, Minnesota; 1972; U. S. Geological Survey 7.5 Minute Series Topographic.

Map 2 shows the location of the proposed flood control diversion channels. The Scope of Work (see Appendix A) for this research project included the 750' elevation or Trunk Highway 212. While the field reconnaissance survey included only those specific areas, the literature search and record review covers the town of Chaska and thus includes the other alternative chanel right-of-ways. All field notes, artifacts and photographs are deposited in the Wilford Archaeology Laboratory, University of Minnesota.

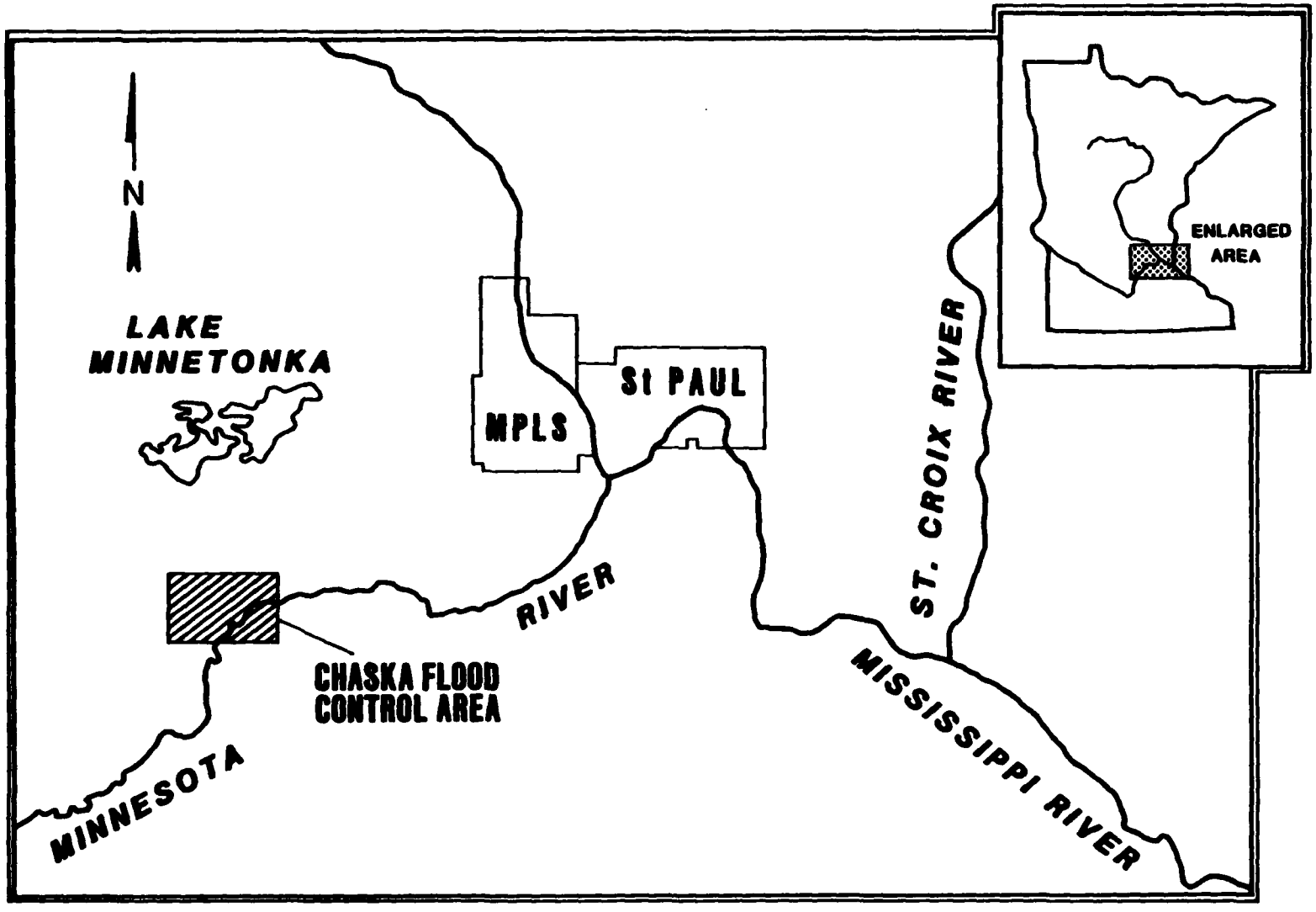

Fig. 1. Location of the Project Area.

2. Environmental Setting

Geology

Glacial drift on the uplands surrounding the Minnesota River valley in the vicinity of the project area was deposited by the Grantsburg sublobe of the Des Moines lobe of the late-Wisconsin glaciation (Wright 1972). The sublobe wasted by c.13000 BP leaving a wide variety of deposits ranging from poorly sorted, fine-textured tills to well sorted, coarse-textured outwash. As the Des Moines lobe melted northward into the Red River Valley c. 1000 years later, principal drainage from the young Glacial Lake Agassiz was through the Minnesota River Valley. The enormous volumes of water flowing through this system at the time were responsible for eroding the present valley which is much wider and deeper than would have been excavated by a stream the size of the current Minnesota River. As Lake Agassiz began to drain to the east and finally to the north through Hudson Bay by c. 9200 BP, volume of flow for the Minnesota was greatly reduced thus allowing increased deposition (Wright 1972). Much of the alluvium of the valley floor in the study area perhaps 10-20 meters, has been deposited over the past c. 9200 years. Colluvial deposits from the bluffs and alluvial fans from the tributaries extend onto the floodplain. In fact, part of the city of Chaska lies upon a small fan formed by West Chaska Creek.

Soils

Most of the soils along the proposed diversion routes are silty to sandy loams of alluvial origin. Some of the soils are periodically inundated by high water and some of them are overlain by peat of marshy areas. Uplands of the bluff tops are predominantly Hayden series loams with lesser components of Esterville sandy loams and others (Edwards 1968).

Vegetational History

Regional vegetation history has been examined in the detail at Kirchner Marsh approximately 20 miles east of Chaska (Wright et al 1963). Although Kirchner Marsh sediments overlie glacial till of earlier origins than that of the project area (Watts and Winter 1966), the postglacial vegetation sequence as inferred largely from palynological data should be similar for the two areas (Sanger and Gorham 1972).

From c. 13,000 to c. 10,500 BP the region was covered by forests dominated by spruce with some ash, oak, birch and other deciduous trees. Ambrosia and Artemisia probably grew in the open areas. By c. 10,000 BP, closure of the forests was nearly complete. Spruce had been completely replaced by a succession of birch and alder followed by pine, ash and balsam fir ending with a deciduous forest dominated by oak. The combined effects of a warming climate, differential migration rates, and successional processes were probably responsible for these changes. Between c. 7,000 and c. 5,500 BP the area was probably prairie. This is demonstrated by the high percentages of non-arboreal pollen types similar to those found in present-day prairies. A maximum of sustained warmth and dryness is inferred for this period of the regional Holocene sequence. The re-establishment of oak-dominated deciduous forests at c.5,500 BP indicates a return to more moist conditions although some of the more mesic components of the earlier oak forest were less prevalent. Deciduous forests with small prairie openings have persisted throughout the region into historic times, but a significant change began about 400 years ago in some parts of the region to the west

particularly those areas affording some protection from fire. Eric C. Grimm indicates that increasing precipitation at this time allowed an increase in more mesic species such as maple and basswood (University of Minnesota Ph.D. thesis in prep; cf. Waddington 1969). These species partially characterize the Big Woods as defined by Daubenmire (1936). Chaska lies on its eastern edge.

A detailed assessment of vegetational history at the project site itself is unobtainable without on-site paleobotanical evidence. Little is known, for example, about how climatic change influences vegetation of the floodplains. A plausible hypothesis is that the continuous water supply of the floodplain allows more stability than is possible in many upland situations in the face of changing precipitation. A fuller understanding of such dynamics requires more evidence than is currently available.

Vegetation at European Settlement

The predominant vegetation types in the immediate vicinity of the project area during the early years of European settlement can be gleaned from the notes of the original land surveys of Minnesota made by the U.S. General Land Office, (Office of the Minnesota Secretary of State, St. Paul). Township boundary and subdivision surveys for T115N and T116N R23W were completed in 1855. The general description for T115N at the time was that it was 'well timbered' with oak, elm, basswood, maple, and cottonwood but there were numerous small prairies. They also noted that the Minnesota River bottom is generally subject to 3-5 foot inundation at high water and that this affords an abundance of 'good grass'. Although surveyed by a different crew, the general description of T116N, R23W is similar. They write that the area is forested with black,white, and burr oak, soft and

sugar maples, basswood, and elm. They state that the township was named for the abundantly occurring sugar maple, Chanhassen, which is the Dakota word for sugar maple. The surveyors also state that the settlers have plenty of natural openings for cultivation and that there are several valuable tamarack swamps in the township.

The description of deciduous forests and small prairie openings for the bluff tops in T116N is consistent with current soils data. Portions of these uplands are dominated by Hayden series which are forest transition soils that have been forested for hundreds of years. There are also pockets of Esterville series, for example, which are prairie soils and may correspond with some of the natural openings noted in the original surveys. Sugar maple and burr oak are the most frequently used species for surveyors' reference points on the bluff tops nearest to the projected diversion routes.

The early descriptions of the forest gallery along the Minnesota river are identical in composition to the present day vegetation. Notes from the survey of section lines near the river usually include mention of willow, cottonwood, soft maple, elm, ash and oak. Bearing trees in the river bottoms were more often elm, ash, willow, and oak. It is also clear from their notes that most of the floodplain was either not forested or only lightly forested. Description of the township line between T115N and T116N for example, continually refers to the timber as 'very scattered' in the river bottom.

While 'high quality' prairie was encoutered in their survey of the section line between Sections 1 and 2, T115N, for example, the lands along section lines nearest the diversion alternatives are described as marsh or wet meadows with "second rate" soils. The marsh referred to in the lower

half of the section line between 34 and 35 T116N, for example, is part of the present day marsh through which the north portion of alternative 3 passes.

A final type of vegetation given special attention by the original surveyors of T116N was wild rice. In the fall of 1854 they noted that the interior of Rice Lake (1.5 miles east of alt. 2) was filled with rice. There was also rice along the edges of Hazeltine Lake, and in the interior of Rice Marsh, 2 miles north, and 5 miles northeast respectively, from Alt. 2.

Present Vegetation

It appears that very little of the proposed diversion routes under study have not been severely altered by human activity in recent times. The possible exception to this is the marshy portion of Alt. 2. Predominant shrubs of the marsh are redosier dogwood, willow and alder; with a wide variety of herbs notably cattails, sedges, and marsh grasses. The upland portion in the south of Alt. 2 above the elevation of 750 feet and the entire length of Alt. 3 above that elevation have been cultivated for decades, at least since the late thirties as indicated in the earliest available aerial photographs. The pickle factory and housing units on the south part of Alt. 3 have eliminated the natural vegetation and have severely disturbed the soil. The upper portion of the West Chaska Creek diversion has been severely disturbed by railroad and highway construction. The lower portion supports tree species common to the forest gallery: cottonwood, silver maple, box elder, ash, elm, willow and white oak.

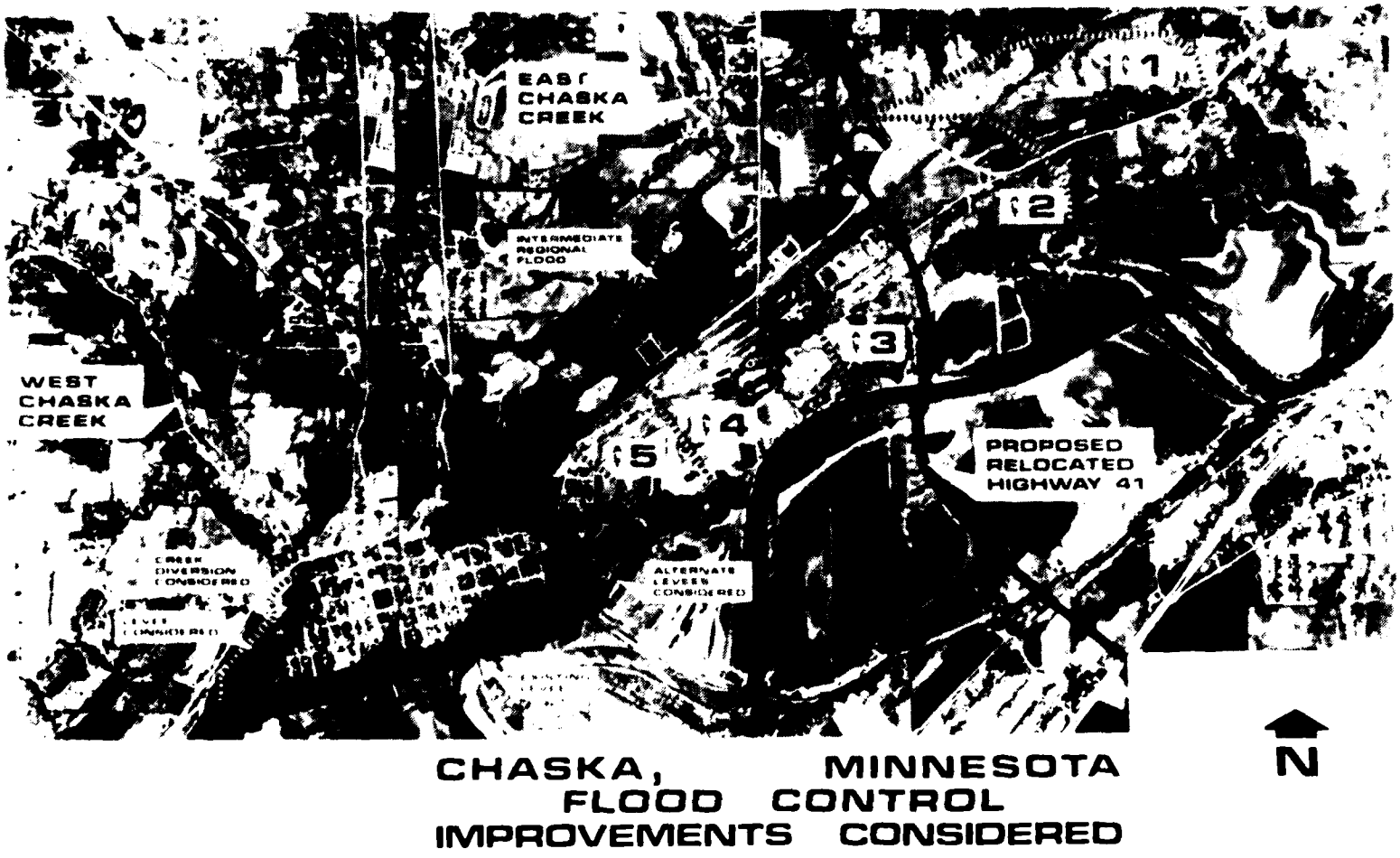

Fig. 2. Aerial view of the Chaska Flood Control Project Area.

3. Literature Search and Records Review

Resume of Sources Consulted

The literature search and records review for this cultural resources investigation was carried out in September and October, 1980, and utilized both primary and secondary published sources as well as archival materials. The principal purpose of this activity was to review and evaluated information relating to prehistoric and historic sites in the study area as an aid to the archaeological survey of the flood control project impact area. Research was conducted in accordance with accepted professional standards and the appropriate agency rules and guidelines.

The research plan focused on the Early (ca. 1700-1805) and Middle (1806-1860) Historic periods and concentrated on the definition of settlement and economic patterns within the Lower Minnesota River Valley region and the explanation of the changes which occured in these patterns through time. It was designed to achieve four major objectives: (1) compilation of site specific location data for use by the archaeologists in the field: (2) identification, review, and evaluation of published and manuscript sources of historical information about the study area, useful for both present and future cultural resource investigations; (3) development of regional criteria for determining site significance; and (4) development of an historical framework for the project area which will provide local contexts of settlement, economic development, environmental change and ethnicity for the region's cultural resources. The emphasis on the location of historic Dakota villages and associated Euro-American fur trade posts, the position of the Little Rapids bands and posts in the regional economic system, and the city of Chaska's French and Yankee cultural origins was designed to complement the recent State

Historic Preservation Office (SHPO) study of Carver County (Lofstrom and Spaeth 1978), which dwelt heavily on post-1850 settlement and economic development.

To the extent possible under the time and funding limits imposed by the Scope of Work, the Chaska literature search stressed primary source materials, specifically the journals, memoirs, and reminiscences of early explorers, traders, missionaries, and settlers; the observations of travellers and government agents; historic maps; and printed documents. Narrative histories, contemporary newspapers, geological and archaeological reports, business records, and photographic materials were also examined. Research in the manuscripts collections of the state historical society was, regretably, of a rather cursory nature; chains-of-title and probate searches in the county archives, often extremely useful in investigations of this kind, were not attempted.

Good bibliographic control is essential for successful literature searches. Not surprisingly, some of the best bibliographies include Minnesota along with the rest of North America, e.g., Marion Kaminkow's excellent compilation, United States Local Histories in the Library of Congress (1975), and Osburn Winther's Classified Bibliography of the Periodical Literature of the Trans-Mississippi West (1961). Michael Brooks' Reference Guide to Minnesota History (1974) almost spares one from using the card catalogue at the Minnesota Historical Society Library. The bibliography published by J. Fletcher Williams a century ago in the Collections of the Minnesota Historical Society (1880) is dated but still useful. For that part of the literature search dealing with the region's native inhabitants, the five-volume Ethnographic Bibliography of North America (1975), edited by George Murdock and Timothy O'Leary, was indispensable.

The archival holdings of the Minnesota Historical Society's Division of Archives and Manuscripts are inventoried in three published guides (1935, 1955, 1977), with supplements available at the research center in St. Paul. Bruce White's Guide (1977) to the Society's fur trade manuscripts offers concise descriptions of the various collections, including microfilm. Walter Ostrem's Bibliography of Theses on Minnesota History (1966) lists only a handful pertinent to the study area. Two outstanding guides by Henry Putney Beers, The French in North America (1957) and The French and British in the Old Northwest (1964) produced some important clues for reconstructing the colonial period in Minnesota.

There is no WPA survey of Carver County records. The Carver County Historical Society's museum in Waconia now possesses well-organized inventory of its holdings, courtesy of the State Historic Preservation Office study, "Multiple Resources of Carver County," carried out in 1978.

The initial bibliographic search produced more than fifty references, all of which were duly checked. Approximately two dozen additional sources, published and manuscript, were present in personal research notes. These were supplemented by citations in some of the secondary literature. Altogether, some eighty-odd published sources were consulted over the course of the literature search, of which a high proportion provided relevant information.

Foremost among the primary sources of site specific data were the writings of the early explorers. For the general background of the Euro-American reconnaissance of the Minnesota River Valley, Winchell's "Historical

Sketch of Explorations and Surveys in Minnesota" (1884) is most useful; the relevant chapters of the general histories by Neill (1858, 1882) and Folwell (1921) and the articles by Christianson (1923), Upham (1913-14), and Mildred Wedel (1974) were also read with profit. Only those interested in geographical fables need consult the Nouveaux voyages (1703) of the colorful adventurer Louis Armand de Lom d'Acre, baron de Lahontan, whose Riviere Longe has sometimes been identified as the Minnesota (cf. Thwaites 1905; Winchell 1884:15-16). The Journal of Pierre Charles le Sueur, recounting his voyage up the Minnesota in 1700 to establish Fort Vert [L'Huillier], was read on a microfilm from the Bibliotheque National in Paris; Le Sueur's Memorial, printed in Pierre Margry's Decouvertes et Etablissements des Francais (1886), and the Relation of Jean Penicaut (McWilliams 1953) were also examined, as was the Le Sueur material in Jean Baptiste Benard de La Harpe's Journal Historique (MS 1766). Jonathan Carver left some important notes on the geography of the "River Bands in his Travels (1956). In a class by itself is the Narrative of an Expedition to the Source of St. Peter's River (1825) by William Keating, particularly valuable for its descriptions of the various native villages along the lower Minnesota River; this was read in conjunction with the Minnesota Historical Society's fine Northern Expeditions of Stephen H. Long (Kane, et al., 1978). Some interesting bits and pieces were culled from the accounts of Giacomo Beltrami (1824), George Featherstonhaugh (1847), and Samuel Pond (Blegan 1940).

Contemporary newspapers offered a number of extremely interesting eye-witness accounts of mid-nineteenth century visits to the Chaska-Little Rapids area. Most of the newspaper accounts cited in the present study were

originally found in Willoughby Maynard Babcock's remarkable collection of transcripts, which fill six boxes in the Minnesota Historical Society's Research Center. Overall, research with nineteenth century Minnesota newspapers was disappointing and considerably hampered by the lack of indexes. Two local papers, the Carver County Democrat (1859) and the Chaska Valley Herald (1862-1875), were examined on microfilm at the Historical Society in Saint Paul.

Maps, plans, and plats of survey were among the key sources for reconstructing the pre-1900 landscape of the Lower Minnesota River Valley. Newton Horace Winchell reproduced a number of important early maps in his "Historical Sketch" (1884), and Aborigines of Minnesota (1911) contains much important geographical information. Alfred Theodore Andreas' Illustrated Historical Atlas (1874) has maps of Carver County and the city of Chaska.

Microfilm of the original 1850's General Land Office township survey plats was viewed at the University of Minnesota. Many maps showing the study area were found by this writer in April, 1979, and February, 1980, while doing research in the Map Division of the Library of Congress and the Cartographic Archives Division of the National Archives and Records Service in Washington. Some maps and plats were found among the holdings of the Minnesota Historical Society.

Primary source material on the historic Indians of the Lower Minnesota Valley was found in the classic edition of The Expeditions of Zebulon Montgomery Pike (1965) by Elliott Coues, and in the other explorers' narratives, discussed above. Very valuable for its observations on Dakota culture history was Samuel Pond's lengthy article in the old Minnesota Historical

Collections (1908). Some useful information was distilled from the writings of Mary Eastman (1849), Stephen Riggs (1880a, 1880b), and Frank Blackwell Mayer (Heilbron 1932). Winchell's classic Aborigines of Minnesota (1911) was very useful, if somewhat dated; another fine secondary source is the unpublished paper by Patricia Albers (n.d.). Ruth Landes' The Mystic Lake Sioux (1968) and Doane Robinson's History of the Dakota or Sioux Indians (1904) could not be ignored. On a much higher level of scholarship was Alan and Nancy Woolworth's fine article on Eastern Dakota subsistence and settlement (1980).

Six general histories of the state found their way into the literature search. The prolific Rev. Edward Neill wrote the first state history of any significance: History of Minnesota from the Earliest French Exploration to the Present Time (1858), based heavily on primary documents and the observations and reminiscences of Neill and other early settlers. William Watts Folwell relied heavily upon Neill's work in his History of Minnesota (1921); perhaps the only significant improvement over Neill is Folwell's use of footnotes and index. A popular history, Theodore C. Belgan's Minnesota: A History of the State (1963), might just as well have been ignored; like the histories of Christianson (n.d.), Charles Flandrau (1900), and Lucius Hubbard, et al. (1908). It is a superficial narrative account of events.

On the history of Chaska, Carver, Shakopee, and other communities in the Lower Minnesota River Valley, the printed secondary material is not unabundant. For general background, Neill's History of the Minnesota Valley (1882) and the relevant chapters in Andreas' Historical Atlas (1874) and Warren Upham's Minnesota Geographic Names (1920) are most useful. The SHPO study, Carver County: A Guide to its Historic and Prehistoric Places (1978), by Ted Lofstrom

and Lynne Spaeth, offers a good synthesis of regional culture history; the MS compilation, "Multiple Resources of Carver County" (1978), was examined in the SHPO files at the Hill Mansion in Saint Paul. Robert Creswell's Among the Sioux (1906) and Julius Coller's History of Shakopee (1933) are unimpressive; Lucie Hartley's The Carver Story (1971) is just mediocre.

A number of mid-nineteenth century immigrant guides and handbooks were searched for information about Chaska and other Minnesota Valley settlements. John Fletcher Williams wrote a fascinating Minnesota Guide (1869). Bailey's Minnesota Railroad and River Guide for 1867-68 (1867) and Nathan Parker's Minnesota Handbook (1857) were interesting; Girart Hewitt's Minnesota; Its Advantages to Settlers (1867) is an excellent example of the genre.

The reminiscences and memoirs of pioneers and tourists yielded some useful background information on the settlement and economic development of the region. Harriet Bishop's Floral Home (1857) and Minnesota: Then and Now (1869) made for interesting reading. E. S. Seymour's Sketches of Minnesota, The New England of the West (1850), H. W. Hamilton's Rural Sketches of Minnesota, The El Dorado of the Northwest (1850), J. W. McClung's Minnesota As It Is In 1870 (1870), and Charles Coffin's Seat of Empire (1870) received more attention than they probably deserved.

For the history of the fur trade in the Minnesota Valley, one must begin with the scanty primary source material scattered through the works of Neill (1858, 1881, 1882), Winchell (1884, 1911), and Upham (1920); careful study of the journals, memoirs, and letters of Pike (1965), Long (Kane, et al., 1978), Keating (1825), Featherstonhaugh (1847), Pond (1908), and other contemporary observors yielded detailed information on traders, posts, routes, and trading

patterns. Cursory examination of the various fur trade-related MSS in the Minnesota Historical Society (Lawrence Taliaferro Papers, Henry H. Sibley Papers, American Fur Company Papers) produced a modicum of useful data. Grace Lee Nute's over-rated "Posts in the Minnesota Fur-Trading Area" (1930) gives scant attention to the Little Rapids posts. Biographic information on individual traders was obtained from Minnesota Biographies (1912), compiled by Warren Upham and Rose Dunlap, some useful data was found in the biographical sketches of Babcock (1939) and Neill (1872). The synthetic works by Claude Stipe (1968) and Patricia Albers (n. d.) focus on the fur trade as a factor in acculturation. The reminiscences of James Lockwood (1856) and Philander Prescott (Parker 1966) provided useful data on the early nineteenth century fur trade in the Minnesota Valley.

The economic history of the study area is summarized in the SHPO study by Lofstrom and Spaeth (1978); Neill (1882) and Andreas (1874) are also valuable secondary sources in this area. The brick manufacturers are described in detail by Winchell and Upham in the second volume of their Geology of Minnesota (1888). Overland transportation in the region is the subject of chapter four in the fine little book on the Red River oxcart routes published by the Minnesota Historical Society (Gilman, et al., 1979); the works of James Baker (1901) and Grover Singley (1974) were also consulted. The history of steamboat traffic on the Minnesota is the subject of a most interesting article by Thomas Hughes (1905) and a fine book by William Petersen (1968) devotes not a little space to the Minnesota River.

The survey of archaeological literature started with Winchell's classic Aboriginies of Minnesota (1911). Archaeological investigations at Little Rapids

in Scott County during the 1930's were reported in three articles published in the Minnesota Archaeologist (Klamer 1935; Brown 1937; Klammer and Klammer 1949). Lloyd Wilford's unpublished "County Memos" included field notes from visits to Little Rapids. The inventory of historic archaeological sites compiled by Timothy Fiske (1965) includes a map of the Little Rapids site in Scott County; no sites are listed under Carver County. Archaeological data for other historic sites in the Lower Minnesota Valley were found in Wilford's report on the excavation of historic burials at Black Dog (1944) and in George Flaskerd's article on trade material recovered from a site at Shakopee (1944).

Records Review

The records review phase of the literature search started in the Wilford Archaeology Laboratory where a complete set of designated Minnesota archaeology site records is maintained by the University of Minnesota's Department of Anthropology. This site file formed the basis for the present State Archaeologist's site file and is kept current. Some relevant information on Little Rapids was obtained from Lloyd Wilford's typescript "County Memos" -- otherwise, the search yielded no data. Investigations then progressed to the Archaeology Department of the Minnesota Historical Society and its repository for site files. Here there was found an interesting typescript on historic sites in the Lower Minnesota Valley, a collection of historical references and background information compiled by Michael Smith.

The county files, archaeological site reports, field notes, maps, and other material deposited in the State Historic Preservation Office are kept in the SHPO's office in St. Paul. The SHPO archaeological file listed a handful of prehistoric sites in the immediate vicinity of CHaska, all of which were originally by Winchell, Upham, and Brower around the turn of the century. Unfortunately, the SHPO's recent county archaeological survey in Carver County did not

cover the areas adjacent to the Minnesota River. The MS report, "Multiple Resources of Carver County," was examined, along with data on standing structures, National Register nominations, and the Walnut Street Historic District, Chaska.

A superficial inspection of records held by the Minnesota State Planning Agency, the Minnesota Department of Natural Resources, the Metropolitan Council, and the Minnesota Geological Survey yielded negative results. Very little relevant information was found in the various planning documents, reports, etc. available from the office of the Chaska city engineer and planners.

Informant Interviews

Information on the Chaska area was provided by Chaska City Engineer James Olson; Chaska City Clerk Shirley Breurs; Chaska city librarian Aldoris Englehart; Carver County Clerk of Court Joyce Vaneyll; Edith Herman of Carver; and Edward Weinzierl of the Carver County Historical Society. Individual owners of property within the impact zone were also contacted. Other Chaska residents contracted personally had no information to offer.

Ted Lofstrom, on the SHPO staff in Saint Paul, was intervied in his office on two occasions with regard to the SHPO survey of Carver County and archaeological investigations in the Minnesota Valley. Alan Woolworth of the Minnesota Historical Society was also interviewed twice; our discussions focused on primary source materials and research undertaken by the Society's Archaeology Department, which Woolworth formerly headed. Douglas Birk and

Douglas George, also the Historical Society, made available the files and library of the Archaeology Department at Fort Snelling and reviewed past research in the study area.

Paul Klammer, Director of the Brown County Historical Museum in New Ulm, was interviewed concerning his historical and archaeological investigations at Little Rapids in October, 1979. The Klammer collection of artifacts from the site was not viewed. Professor Janet Spector of the University of Minnesota discussed the findings of her summer field school in archaeology, held at Little Rapids. Professor Rod Squires of the Department of Geography, University of Minnesota, offered much useful information on the original U. S. land survey records for Minnesota.

Mildred Mott Wedel, Research Associate in the Anthropology Department, Smithsonian Institution, an authority on the eighteenth century French reconnaissance of the Upper Mississippi Valley and an ethnohistorial extraordinaire, provided many helpful suggestions in a number of letters and kindly allowed access to her notes and bibliography regarding the Le Seuer expedition.

The Carver and Scott county historical societies allowed use of their historical collections at Waconia and Shakopee.

Prehistoric Sites

The literature search and records review indicated five known prehistoric sites in the general study area but none in the specific project areas surveyed under this contract. All are mound groups; none have been archaeologically reported so that cultural affiliations, age, and formost, the present conditions are not known. Only one site (21 CR 2) is situated within the city limits of Chaska. This site is not in any way endangered by the proposed flood control project.

The roster of prehistoric sites in the study area is as follows:

(a) Mounds in the City Park, Chaska. Three tumuli, with remains of a fourth nearby reported by Winchell (1911:180), are designated by Site Number 21 CR 2. Winchell described the mounds as measuring between forty-four and sixty-five feet in diameter, three-to-five feet in elevation. These are the mounds described by Neill in his History of the Minnesota Valley (1882: 357-358). They are preserved in the park area.

(b) Mounds opposite Chaska (21SC26). Winchell reported sixty-nine mounds arrayed along the river, approximately one hundred feet above the bottoms, covering some 3,400 feet along the bluff (1911:191).

(c) Carver mounds. One mound, measuring thirty by one-and-a-half feet in 1882 (Winchell 1911:183), now designated Site Number 21 CR 3, in the village of Carver. A group of eight tumuli, the largest measuring eighty feet in diameter by six feet high, was located one mile south of Carver about a dozen feet above the river bottoms (Winchell 1911:183); this site bears the number 21 CR 4.

(d) Little Rapids mounds. A large group of burial mounds, situated approximately 140 feet above the river in Louisville Township, Scott County. The mound group was investigated by Winchell, et al., and by Klammer, and various avocational archaeologists during the last half century. The historic fur trade post at Little Rapids is associated with this site, designated 21 CR 5, but perhaps should be given a separate designation in the future. A village site near the mound group is now under investigation by Professor Janet Spector, University of Minnesota. She indicates the village site to be Wahpetan Dakota inhabited from 1820 to 1835.

Historic Sites

A total of six sites or groups of sites dating from the Early and Middle Historic periods (ca. 1700-1860) were indicated within the study area. On the basis of data obtained through the literature search and records review, each of these sites is potentially eligible for nomination to the National Register of Historic Places; all are significant in regional history, yet have heretofore been largely neglected by historians. Only one has been the subject of controlled archaeological investigation under the supervision of professionals.

Documentation for several sites is not particularly abundant -- indeed, in the case of the historic Wahpeton village, the historical data are minimal. Site specific locational data are not available for individual sites associated with the Chaska townsite, and for several of the fur trade posts known collectively as the "Little Rapids" post. More intensive literature searches and archival investigations are needed if these potentially significant historic sites are to be located, identified, interpreted, and preserved. The archaeological visibility of many of these sites is probably quite low and finding them under present conditions would be difficult.

The historic sites indicated by the literature search and records review are as follows:

(a) Chaska townsite (1851-). The first Euro-American settlement on the site was made in 1851 by Thomas Holmes, who subsequently sold the parcel to land speculator David Fuller in 1852 (Neill 1882:357). Claims were taken out in Fuller's tract beginning in 1853; the first settlers were mostly Germans from Saint Paul (Neill 1882:358). The village itself was founded in

June, 1854, by the Shaska Land Company, with most of the settlement taking place in sections 4, 6, 7, 8, and 9 (Upham 1920:82; Neill 1882:358).

The earliest record of any kind of permanent structure at Chaska dates from 1853, when a traveller writing in The Minnesotan (23 July, 1853) observed a single house situated on "a small and beautiful prairie", presumably very near the river. Neill recorded that the first store, built in 1854, was on the levee (1882:360); by 1856 the town boasted twenty-six buildings, including a sawmill, four stores, and a hotel under construction (Lofstrom and Spaeth 1978:38). The Minnesota Historical Society has in its collections a watercolor by contemporary landscape artist Edwin Whitefield showing Chaska as it looked in 1856 -- this picture is reproduced as an illustration on page 41 of the SHPO's published Guide (1978) -- complete with notations on the price of town lots and the susceptibility of the river flats to flooding. About a dozen structures are visible, including a large two-story "store" and a "Saloon/Post Office." In 1853, one George Allen established ferry service between Chaska and Little Rapids (Andreas 1874:232), taking over or replacing the earlier ferry observed by a river traveller in 1852 (Minnesota Democrat, 14 July, 1852); there is a photograph of the Chaska-Merriam Junction ferry, ca. 1880, reproduced in the SHPO Guide (Lofstrom and Spaeth 1978:23).

Residential and commercial development was concentrated along Walnut, Pine, Cedar, Ash, and Maple Streets, south of Third Street, later extending farther west along Second and north on Walnut. 1866 was a boom year: more than thirty new buildings were started, including two breweries. (Lofstrom and Spaeth 1978:38-42, 70-77, passim; Hood 1857; Andreas 1874).

During the last quarter of the nineteenth century, industrial activity in Chaska was dominated by the manufacture of bricks. In 1866 the town

shipped 800,000 of them to Saint Paul and Minneapolis. Winchell reported four local companies making the cream colored bricks in 1879; by 1884 there were eight brickyards in operation, employing some three hundred and fifty men on a seasonal basis, consuming eighteen thousand cords of wood, with brick production put at thirty million annually (Winchell 1888:141, 145). These yards were located on the eastern edge of town, about a half mile west of the railroad bridge, thirty-five feet above low water -- the area is completely developed today.

Undoubtedly, many of the earliest structures raised at Chaska were built of hewn logs, chinked with mud. Before 1857, the Shaska Land Company required purchasers of town lots to build housing within a specified length of time and within a fixed budget. This policy resulted in a large number of wooden frame buildings with clapboard siding and was a great boon to the fledgling lumber industry. Beginning in the 1860's, brick structures became commonplace. A prevalent architectural type was the wood or brick L-plan house, a traditional Anglo-American house referred to locally as the "Carver Cottage Style," dating from 1850 to ca. 1880. Many structures of nineteenth century vintage are still standing.

It is not easy to estimate the archaeological potential of sites associated with the village of Chaska. Reliable, detailed site specific data for individual structures no longer standing are lacking. Nevertheless, it would seem unlikely that many of these sites would lie in or immediately adjacent to any of the proposed flood control construction. The data at hand suggest that the brickyards are outside the impact zone; again, there is a serious lack of locational data. Some sites dating from the Late Historic Period (1860-1900) might be found in the vicinity of the proposed levee construction.

The State Historic Preservation Office survey of Chaska includes a list of a number of historic period buildings and areas existing today (Lofstrom and Spaeth 1978:70-80). These include:

*1. Walnut Street Historic District. Nineteen structures, dating from 1858-1902, located in an area between First and Fifth Streets, along Chestnut and Walnut streets. These include private residences, commercial buildings, a foundry, and a church. The Indian burial mounds in the public square are also considered part of the district.

2. Teske Mille - Chaska Mill, 102 West Fifth Street. Constructed 1879; now a warehouse.

3. Andrew Riedele House, 122 West Sixth Street. Brick house built 1879.

*4. Brinkhaus Saloon Livery Barn, Fourth Street. Built 1879's.

5. Sell House, 301 East Third Street. Oldest brick residence in Chaska, built 1857.

*6. Frederick Greiner House, 319 East Third Street. Built 1870's.

7. E. A. Taylor House, 403 East Third Street. Constructed sometime between 1858 and 1871.

8. National Hotel - Rex Theatre, 211 West Chestnut Street. Wood frame hotel constructed in 1868.

9. Gustave Krayenbuhl House, 207 Walnut Street. Brick house, raised 1870.

10. Glatzel Shoe Shop, 115 West Second Street. One of the city's oldest commercial buildings, built sometime in the mid-1800's.

11. Merchant's Hotel, 119 West Second Street. Two-story wood frame hotel, constructed 1875.

*12. Herald Block, 123 West Second Avenue. Built 1871 to house Chaska Herald newspaper.

13. George A. DuToit House, 208 West Second Street. Built 1878.

14. Guardian Angels Catholic Church, Cedar and Second Streets. Constructed between 1880 and 1903.

15. E. H. Lewis House, 321 West Second Street. Built 1870's.

*16. Eder-Baer House, 105 Elm Street. Constructed ca 1890 in Queen Anne style.

*17. Frederick D. DuToit House, 121 Hickory Street. Brick house, built 1870's.

18. Simons Block and Livery Barn, 123 West Third Street. Built of Chaska brick in 1886.

19. Beyrer Brewery, 596 Stoughton Avenue. The third brewery to operate in town, built 1866.

20. American Crystal Sugarbeet Processing Plant, Office, and Seed Barn, 1059 Stoughton Avenue. Complex of buildings constructed 1906, operated 1924-1971 as sugar beet processing facilty.

*21. Iltis Brewery and Ice House, 597 Stoughton Avenue.

Those marked with an asterisk were placed on the National Register of Historic Places in January 1980.

(b) Oliver Faribault post (ca. 1840-1850). There is no primary source locating Oliver Faribault's post, one of several "Little Rapids" trading stations maintained by the Faribault family. The missionary Ravoux wrote of spending the winter of 1842-1843 with the Faribaults at "la Petite Prairie (maintenent Chaska)", where they had a post, occupied by their families and a few others (Ravoux 1892:4). The Minnesota Handbook speaks of Oliver Faribault's "extensive" trading house at Chaska, settled "principally by Canadians, most of whom left with him" sometime before Holmes' arrival in 1851 (Parker 1857:39). No maps show the post and fur trade records consulted refer vaguely to posts "at" Little Rapids, which may or may not have included Little Prairie (Chaska).

There is, however, a piece of intriguing information in Neill's (1882) History of the Minnesota Valley: when the land speculators bought up Holmes' claim, they found the site already cleared, with evidence of prior occupation and cultivation. Strawberries and asparagus were abundant; there were "indications of a garden and quite extensive buildings having once existed near the bend of the river"; later excavations on the site turned up artifacts, including gun parts and iron tools, suggesting a prior European occupation, possibly of late eighteenth century vintage (Neill 1882:357).

The most likely location for the Faribault post would seem to be somewhere in the northwest quarter of Section 9, T-115-N R-22-W within the Chaska city limits, probably inside the existing levee. However, the site could possibly be located somewhere south and east of Courthouse Lake, an area that would be impacted by Diversion Alternates 4 and 5, and would therefore be susceptible to impact from construction.

(c) Augustin Ravoux chapel (1843-1844). Father Ravoux came to the Little Rapids district in 1843 at the request of Jean Baptiste Faribault, who had urged the priest to establish a permanent Roman Catholic mission there. According to his Memoires, Ravoux wintered with the elder Faribault and his sons, David and Oliver, at their post on the Little Prairie at Chaska (1892:4). Details about the short-lived mission are scanty: Coller gives the dimensions of the chapel as fifteen by thirty feet (1960:13). Presumably it was of log construction, similar if not identical to the Faribaults' post, most likely in the style of la maison de pieces sur pieces, i.e., a cabin built of hewn logs laid horizontally. Ravoux himself departed in the spring of 1844, never to return. The little chapel was floated downriver to Shakopee that spring; later it was rafted to Wabasha on the Mississippi (Coller 1960:14).

The Ravoux mission was almost certainly located near the Faribault compound at Little Prairie. Secondary sources refer to the priest staying among the Faribaults, rather than in the nearby Wahpeton village, then located somewhere between Chaska and present-day Carver. Archaeological identification of the Ravoux mission site would be next to impossible: the mission was occupied for only a few months and the building itself was removed.

(d) Historic Wahpeton Village (ca. 1800-1851). The historic Wahpeton, or Gens de Feuilles, one of the bands comprising the Eastern or Santee Dakota, were living at Little Rapids at the time of Pike's expedition (Coues 1965:346-347). Keating (1825:345-346) and Featherstonhaugh (1847:291) observed a Wahpeton village, "Weakaote", above the rapids in the vicinity of present-day Belle Plains -- there can be no doubt that this was the "Sand

Hills" village noted by several later nineteenth century writers. Pond listed Wahpeton villages at Carver, St. Lawrence, Belle Plaine, and Traverse des Sioux, all of which, by inference, were being occupied ca. 1834 (1908:321). Sibley refers only to the Wahpeton village at Belle Plaine (1880:250). This site is now being excavated by Professor Janet Spector, University of Minnesota.

In 1850, the first steamboat to navigate the Minnesota River as far as the rapids raided an Indian burial ground for fuel before returning to Fort Snelling as described on the following page (Hughes 1905:138). This may have been the "Indian graves" in Section 32 T-115-N R-23-W noted by government surveyors in 1854 (Land Survey MSS).

Almost all of those who have written about the Santee Dakota have noted the tendency of the individual bands to disperse into smaller groups. Village sites were occupied, abandoned, and re-occupied. The Wahpeton settlements in the Little Rapids area would seem to conform to the settlement model offered by Patricia Albers: the villages were made up of close-knot family groups, which were, from time to time, enlarged by the addition of distantly related peoples or diminished through attrition or segmentation; some groups disappeared altogether (Albers n.d.: 11). As the nineteenth century progressed, some bands determined to settle at the posts erected by traders like the Faribaults and Louis Robert.

There are references to a Wahpeton village in the Carver-Chaska area: the Lewis and Clark map of 1806 shows a "Sioux" village on the west bank of the Minnesota River at a spot Winchess thought might correspond to Carver (1911:59-60); Louis Robert's "old" trading post was said to be nearly opposite

Chaska in the Wahpeton village (Hughes 1905:135); and an 1852 observor noted in passing that Chaska "is an old but abandoned Sioux town site" (Minnesota Democrat, 14 July, 1852). There are numerous references to the Carver Indians in the secondary sources, although it is perhaps significant that neither Neill nor Upham mention a Wahpeton settlement there.

It would seem reasonable to believe that there were Wahpeton bands directly associated with the Little Rapids posts of Oliver Faribault and Louis Robert -- one might go so far as to identify the former with the "Carver Indians" and the latter with the "Sand Hills" band. Therefore, we might speculate about the presence of an historic Wahpeton occupation at Chaska on the basis of Thomas Holmes' 1851 license to establish a trading post there (Neill 1882:357). The site would have been well suited to native settlement because of its access to the river and position on the Big Woods-prairie transitional zone.

(e) Louis Robert posts (1850-1854). Captain Robert of Saint Paul established himself at Little Rapids in 1850, erecting a post among the Wahpeton at the "White Sand" village near the rapids located some distance upstream from the town of Chaska (Minnesota Chronicle and Register, j July, 1850); this was the post visited by the steamer Anthony Wayne and its "jolly crowd" of tourists before they vandalized the Indian burial ground and a nearby abandoned fur post for firewood. In 1852, Robert had relocated himself at Robert Creek, Scott County (Upham 1920: 511), about a mile and a half upstream from his "old post" (Minnesota Democrat, 14 July, 1852). For awhile, Robert combined the Indian trade with land speculation, laying out a townsite called Louisville, which an 1854 observor found empty (Saint Anthony Express, 10 June, 1854). Robert was at the time still trading at Little Rapids, for the "Sand Prairie" band of

Wahpeton still occupied their "ancient camp" across the Dismal Swamp from Robert's establishment (Minnesota Democrat, 7 June, 1854); the same source describes Robert's post as consisting of two "comfortable" log houses located on the trail to Traverse des Sioux.

(f) Little Rapids trading posts (ca. 1820-1850). Between five and twelve fur trade posts were located at Little Rapids (Spector, pers. comm.), very few of which can be documented. The site excavated at Little Rapids by the Klammers (Klammer 1949) cannot be identified with any known fur trade post; archaeological evidence from the site would seem to indicate an 1840's occupation. Among the earliest recorded trading establishments at Little Rapids was that of James Lockwood, who was active in the area during the 1820's (Lockwood 1856:186). Louis Provencalle's Little Rapids post was probably occupied between 1823 and 1825; in 1826 Provencalle transferred his operation to Traverse des Sioux (Babcock 1939: 263-264). Jean Baptiste Faribault's "Fort Lewis" post dates from 1826, when Indian Agent Taliaferro issued a license for him to trade there (Neill 1889:114; Taliaferro MSS); after removing himself to Traverse des Sioux, Faribault returned to Little Rapids in 1828-1829 (Babcock 1939:265) and again in 1833-1834 (Neill 1858: 415-416). Pond indicated that the elder Faribault traded at Carver, where he wintered (1908:338). Primary source data for other trading posts is lacking.

None of these posts appear to have been very substantial. "It should be understood that most of the peltry posts ... were temporary huts of logs for winter quarters, occupied and again abandoned when no longer serviceable to an ever-changing trade" (Bunnell 1884:52). Bunnel was writing about the trade on the Mississippi, but what he says certainly holds true for the

Minnesota Valley, although detailed descriptions of individual posts in that region are practically nonexistent. Frank Mayer sketched Louis Provencalle's cabin at Traverse des Sioux in 1851: here is a single-pen log cabin built pieces sur pieces, probably measuring eighteen by twelve feet. Perhaps the Faribault buildings at Little Rapids were more extensive; the log house built at Shakopee by Oliver Faribault around 1850 is preserved in the Minnesota Valley Restoration and is certainly something more than a mere log hut.

Site specific locational data for the various Little Rapids posts is virtually nonexistent. The problem is compounded by confusion in the secondary literature stemming from the assumption that the Little Rapids was a single site located in present-day Scott County. No doubt the earliest inhabitants of the area adopted the peculiar French custom of refering to a settlement dispersed over many miles in the same way that Anglo-Americans would speak of a single place, a dot on the map. Obviously, "at Little Rapids" has a meaning beyond Louisville Township. A clear conception of Little Rapids emerges after a careful study of the primary source material and maps made during the early 1800's.

In addition to the trading post site excavated in Scott County, Mr. Klammer has informed the present writer of another as yet unrecorded site yielding trade goods and other diagnostic material, located in a farmyard in the southeast quarter of Section 31, T-115-N R-23-W. As in the case of the site across the river, this post defies identification with any specific trader or date.

4. Regional Prehistory and History

The prehistoric archaeological sequence in the lower Minnesota River valley is one of themost poorly known in Minnesota despite its proximity to the major urban center, academic institutions, and the state historical society. There are no excavated, published sites from Carver County; only minimal data from adjacent Scott County; and minor, fairly non-informative burial mound excavations from Hennepin County (Streiff 1972). A major collection of lithic artifacts from the Hasse site located in the uplands of western Carver County has been analyzed but not published. This surface collection constitutes the only significant prehistoric assemblage and on the basis of typological comparison, suggests utilization of the upland areas from the Early Prehistoric period into the Early Historic Period.

The temporal sequence for central and southern Minnesota, following that proposed by Johnson (1979), consists of three major periods beginning with the Early Prehistoric following the terminal glaciation at about 11,000 BP and continuing until the Middle Prehistoric beginnings at about 1,000 BC.

The Early Prehistoric Period is characterized culturally by two major traditions that appear sequentially. The earliest is that called Paleoindian and in Minnesota includes projectile points of both Folsom and subsequent Plano types, presumably utilized by bison hunters. Plano points are known from surface collections in Carver County, but none have been see in the immediate Chaska area. The latter portion of this early period is dominated by cultures of the Eastern Archaic tradition characterized by much more intensive utilization of wide varieties of faunal and floral resources. Again, lithic tools of this period and tradition occur in Carver

County collections, particularly from the Hasse site, but no excavated, published sites exist in the lower Minnesota River valley. Good summaries of the general western Great Lakes area and these traditions can be found in Quimby (1960).

The Middle Prehistoric Period is marked by the intrusion of two highly visible additions to the archaeological inventory. These are the first ceramics and the development of human burials in constructed earth mounds. Data from Commissary Point on Prairie Island in Goodhue County and from the Schilling site on Grey Cloud Island in Washington County show the earliest ceramics. These ceramics are cord marked, truncated cohoidal vessels like that from La Moill Cave (Hudak and Johnson 1975) and have their derivation from the Early Woodland traditions ceramics of Illinois.

It is inferred that the earliest burial mound traditions are also intrusive into the Mississippi and Minnesota valleys from the south and southeast but the data are few and this inference remains a culture-historical hypothesis that must be tested. A review of this early mound complex can be found in Johnson (1978).

From the pattern of distribution of such early sites, it can be suggested that habitation sites with early ceramic associations exist in the lower MInnesota valley and would most likely occur in the valley trench on the lowest river terraces. The burial mounds, however, appear most commonly on higher terraces and along the upper bluff edges overlooking the valley.

Lacking excavation evidence, there are no data to indicate any changes in the subsistence economies of this period, and until such data appear and prove otherwise, it is probable that the late Archaic diffuse economic patterns continued without significant change.

As the Woodland tradition continues in this Middle Prehistoric period, significant changes do occur. Data from the Sorg Site in Dakota County; survey data from Anoka County; and Schilling Site excavations (data obtained from Wilford Archaeological Laboratory files) all show the presence of ceramics that have affinities to the Havana tradition of the central Illinois valley. Lloyd Wilford described a "focus" or phase that he labelled Howard Lake (Wilford 1955) that accommodates this segment of the Woodland tradition in east central Minnesota.

Whether this phase includes changes in subsistence practices is not known. Further south, sites indicate the presence of flood plain agriculture with chenopods and amaranths the characteristic cultigens. Illinois sites of this period show the presence of some maize and squash as well, but there is no evidence for these cultigens at this period in Minnesota.

The location of sites on and immediately adjacent to the flood plain further south reinforces the need for deep testing of flood plain areas in the vicinity of Chaska. Recent river deposited alluvium may overlie such sites.

The final phases of the Woodland tradition in this period as seen only 80 miles north show the beginning of intensive utilization of wild rice as a food staple, and with that subsistence shift, a tendency toward settled, year-round village sites. (Johnson 1969). There is no archaeological evidence for this in the Chaska area, but as seen earlier in the section of this report on the environmental setting, extensive beds of wild rice did exist in the region and may well have been utilized by the prehistoric population.

The final prehistoric period begins approximately 900 AD and is characterized by the presence of a new tradition called Mississippian. Marked by

shell tempered, smooth surfaced globular ceramic vessels, the Oneota Mississippian cultures of this northern area are characterized by permanent villages; cultivation of maize, beans, squash and tobacco; and the utilization of the nearby grasslands for the hunting of bison. Sites of this tradition are well known and well documented from the Cannon River junction with the Mississippi some 60-70 miles downstream from Chaska (Gibbon 1979). There the sites are on river terraces located above the flood plain. While none were discovered in the Chaska area, the location on the first or second terrace where either East Chaska Creek or West Chaska Creek flow to the flood plain, are analagous to Oneota site settings further south.

Upstream from Chaska there are other Mississippian village sites associated with the Cambria culture. These sites are in part contemporary with the Cannon River Oneota sites, have very similar prairie "maize-bison" subsistence economies, and are located in similar physiographic settings. The probabilities are high that other Oneota and/or Cambria sites will be found on terraces in the Minnesota River Valley above Chaska and it is conceivable that the historic Wahpeton Little Rapids site now being excavated may have an earlier component or components from this late Prehistoric Period.

It is also quite possible that Alternative 1, 4, and 5 suggested for this flood control project may cross such sites, although the disturbed nature of the land may preclude the presence of any intact site.

Historic Indians

Prior to 1700, French missionaries and coureurs des bois based in Eastern Canada had made intermittent trips to the country of the people

they knew as the Nadouessioux, there to seek furs and converts. There are no data for what is sometimes called the "protohistoric" period which is usually defined as a "grey period" of indirect European influence preceding the first written record. It was not until the start of the eighteenth century that an attempt was made to establish a permanent outpost in the region. In 1700 Pierre Charles Le Sueur led an expedition up the Mississippi from Biloxi on the Gulf of Mexico, ostensibly to mine what he thought were rich copper deposits on the Riviere St. Pierre (St. Peter's or Minnesota River). The Frenchman was mistaken in his assay of the mine, located near the site of present-day Mankato, and Fort L'Huillier was abandoned. While it can be debated whether or not Le Sueur was the first European to ascend the Minnesota, his journals are nevertheless our earliest record of the region's native peoples.

The Lower Minnesota River valley was the territory of the Eastern or Santee Dakota. At the time of Le Sueur's visit, the Santee had their villages near Lake Mille Lacs and hunted seasonally on the Minnesota. Later, the Santee settled in a number of villages along the Mississippi and Minnesota rivers. Those occupying the Lower Minnesota valley were the Mdewakanton, called Gens du Lac ("People of the Lake") by the French; the Wahpeton or Gens des Feuilles ("People of the Leaves"); and the Sisseton, a group whom the French classified Gens du Large ("People of the Plains").

The Gens du Lac were living near the confluence of the Mississippi and the Minnesota rivers in three large villages at the start of the nineteenth century. Le Sueur suggests two separate bands of Gens des Feuilles; but by the early 1800's these are the Wahpeton bands which appear to have coalesced into a villabe on the Minnesota at Little Rapids. The Sisseton were seminomadic rovers with settlements on the upper Minnesota amongst the other plains bands. By the 1830's the Mdewakanton and the Wahpeton had fragmented

into numerous small bands, probably a direct response to the pelty trade. The differences between the Gens du Lac and Gens des Feuilles were not great and by 1800 all were under the commercial influence of the Euro-American trading companies. By 1820 every village probably had some residents who knew French, which was, like Mobilian in the Lower Mississippi Valley and sign language on the Great Plains, the regional lingua franca or trade language.

The bands were semi-independent sub-groups, comprised of one or more extended families and named for their appearance, character, or some peculiarity of location. "These groups could be enlarged by the addition of distinctly related peoples and diminished through gradual attritions or sudden sugmentation in their ranks," write Patricia Albers; "Some even dissappeared with their members reconstituting alliances among other extant or emerging groups" (Albers n.d.:11). Intermarriage was common among all the Santee bands - Pond described them in 1834 as "more or less intermingled at all their villages" on the Minnesota (1908:320). Intermarriage with people of European stock, particularly the French-speaking voyageurs, bourgeois, and coureurs des bois engaged in the fur trade, was common. By the mid-1900's sizeable trading post bands, consisting largely of metis or bois-brule mixed-bloods, were not uncommon.

As the early maps show so clearly, both the Gens des Feuilles and the Gens du Lac preferred to establish their villages along the rivers, usually a site on rising ground at the edge of the floodplain, oftentimes on the margin of a swamp or lake -- the most productive part of the riverine eco-system. Yet looking at the historical record, one is struck by the fact that the location of the Mdewakanton and Wahpeton settlements had relatively little to do with subsistence. The village sites were

occupied seasonally, with most of the population gone away hunting for months at a time; the villages were full of people only during the winter months, the least productive time of the year.

The fragmentation of the Santee into numerous small bands after ca. 1800 was probably due to three inter-related factors. First and foremost, the peltry trade demanded that native hunters range over very large areas, the hunting grounds nearest hte home village being utilized first; therefore, it was not practical to remain in large villages far from the sources of peltry. The second factor was the introduction of firearms: so armed, hunting parties could be smaller, their efficiency increased. There was also the application of European weaponry to inter-tribal warfare; the bottom line here was that small groups, armed with muskets, could better defend themselves against Ojibway raiding parties.

The native inhabitants of the Lower Minnesota River Valley during the 1800's were semi-sedentary hunter-gatherers who lived in small villages and dispersed hamlets. They farmed a little: cultivating maize, beans, squashes, and tobacco in small plots cleared by slash-and-burn along the fertile river bottoms. They hunted the buffalo until the heards migrated farther west; deer was more important than either beaver or muskrat, both as a food source and as a commodity in the peltry trade. Autumn was a time for gathering wild rice -- some was obtained along the Minnesota, but most had to be harvested on the lakes to the north. Springtime meant maple sugar, some of which no doubt was used in trade. Both the Wahpeton and the Mdewakanton built rectangular summer cabins of saplings planted upright on the ground, the walls and gabled roof covered with bark. Corn and squashes were dried in the sun on scaffolds attached to the houses [Skinner (1919), and

Woolworth (1980)].

There are no reliable population figures for the Indians of the Lower Minnesota Valley. Pike, writing in 1806, estimated 2,105 "Probable Souls" in the three Mdewakanton villages; 1,060 among the Wahpeton (Coues 1956: 346-347). Keating placed the number of persons living in the villages visited by the Long expedition between Mendota and Traverse des Sioux at seven hundred (1825:396). Julian Bond lists the populations of Shakopee and Little Rapids at 450 and 150, respectively (1856:201). There is no reason to believe any of these figures are accurate.

The impact of the native peoples on the physical environment of the Minnesota Valley is difficult to determine. It is probable that excessive hunting decimated the faunal resources of the region -- the destruction of the deer herds here can be likened to the wastage of the buffalo on the plains by later generations. Another important instrument in environmental change was fire. The Santee and other Indians used fire for a number of purposes and it may be that in some cases the fires got out of hand and had effects that the native farmers never intended. Slash-and-burn agriculture, which called for the girdling of large trees, the cutting and firing of brush and forest litter, cleared the bottomlands near the villages, incidentally adding potash to the Indian gardesn and could be the creator of the "old field prairies at Little Rapids and elsewhere.

Explorers

The village of Carver, founded in 1851 and therefore the oldest Euro-American settlement in the Minnesota valley, owes its name to a British militia colonel from Connecticut, one Jonathan Carver. Carver was sent to the territory inhabited by the "Minnesota" Sioux in 1767 by the commandant at

Mackinac to invite the natives to a peace conference there and, incidentally, find the elusive Northwest Passage. The little expedition made its way up the Mississippi, visited the celebrated cave which still bears Carver's name, and then wintered among the Dakota bands on the upper reaches of the river "St. Pierre, called by the Natives Wadapawmenesoter." The St. Pierre is the Minnesota River today. While ascending, Carver stopped to name one of the tributary streams --

> on the 28th [of November], being advanced about forty miles, I arrived at a small branch that fell into it from the north; to which as it had no name that I could distinguish it by, I gave my own. (1956:74)

This was probably the stream called Odowan ("hymn") by the Indians, the Riviere de la Mine de Charbon ("coal river") of Le Sueur (Delisle Map 1702), still Carver Creek on today's maps. Carver noted but did not bother to name the rapids a few miles upstream: The Little Rapids, now commonly known as the Carver Rapids.

Carver didn't encounter any villages along the Lower Minnesota, although his map does show a cluster of tipis near the site of present-day New Ulm, perhaps denoting his wintering camp.

Carver was not the only European carrying out a reconnaissance in the region during the 1700's. Coureurs des bois and perhaps even a few licensed North West Company traders were in and out of the Minnesota Valley throughout the century, although no regular network of trade was established until the 1780's, European geographical knowledge of the Riviere St. Pierre and the Indians living along its banks shows a slow but steady increase in the maps drawn during the first half of the eighteenth century. Franquelin's 1688 map traces the Minnesota River through the lands of "Les Mascoutens Nadouescious" but dues not name it; the Delisle maps, drawn in 1702 and 1703 from information supplied by Le Sueur personally, show the river in some

detail as the "R. St. Pierre," the name Le Sueur is supposed to have bestowed upon it (Neill 1858:161-162; cf., Coues 1965:80n-81n). *Vaugondy's* map (1755) contains the earliest cartographic reference to Minnesota -- "Ouadeba Menissoute au R. S. Pierre."

The next explorer to write about the Lower Minnesota Valley was the extraordinary Lieutenant Zebulon Pike, who carried out a detailed reconnaissance of the Upper Mississippi country in 1805-1806. Pike's report devoted considerable space to ethnographic information, natural resources, and regional geographical lore. His knowledge of the Minnesota Valley was distilled largely from his conversations with North West Company engagees and the published works of other writers. He did not attempt to map the river he knew as the St. Peter's.

In 1817 an officer of the U. S. Topographical Engineers, Stephen H. Long, ascended the Mississippi in a six-oared skiff in order to survey the site of the future Fort Snelling. In 1823 he returned with a party of scientists and followed the Minnesota to its source. A geologist in the Long pary, William Hypolite Keating, wrote a very detailed memoir of the expedition, published in 1825. Narrative of an Expedition to the Source of St. Peter's River is one of the most important primary sources for reconstructing the Santee landscape. In addition to physiographical observations, Keating offers detailed descriptions of several villages, their physical setting, types of houses, native name, and population.

Keating describes four Mdewakanton villages on the Minnesota River. The first, Oanoska, was about five miles upstream from Fort Snelling, on the right bank (1825:339); this was the site commonly known as Black Dog's village. About seven miles farther upstream, also on the right or north side of the

river, was Tetankatane or the "Old Village" from whence the Mdewakantons had dispersed sometime in the eighteenth century (1825:342); here we have the settlement later known as Pinisha (Pinichon) and Good Road's. About twenty-two miles higher was Taoapa, home of Shakpe or Little Six, a very large village consisting of fifteen "large bark lodges, in good order" (1825:342). Six miles above Taoapa the party came to a "fine piece of rising ground" known by the name of Little Prairie; then came two rapids, about half a mile apart (1825:344-345). Six miles above the rapids lay Weakaote, "a small Indian settlement," partly in ruins (1825:346); next day the explorers found the Weakaote band encamped on a large prairie at the edge of the Big Woods and learned that they intended to relocate themselves farther upstream (1825:348). The Long expedition found the Wahpetons further upriver, near its headwaters.

Accompanying the Long party was a gentleman from Italy, Giacomo Constantino Beltrami, who was for all intents and purposes a tourist. Beltrami also wrote a book describing his voyage up the St. Peter's, which Winchell described as a "gossipy and literary curiosity in the field of exploration" (1884:45).

In 1835 an Englishman, George W. Featherstonhaugh, undertook a "geological reconnaissance" of the Minnesota Valley on behalf of the United States government. Twelve years later he published a two-volume travel memoir, entitled A Canoe Voyage up the Minnay Sotor (1847), which contributed little to the geographical lore of the region. Featherstonhaugh did note, however, that the Weakoate band had established themselves at the Sand Hills [near present-day Belle Plain] (1847:291), just as they had told Keating they would in 1823.

Fur Trade

The thing that brought Europeans to the Minnesota Valley in the first place was beaver, that industrious, chisel-toothed rodent called castor by the French, "hairy banknotes" by the Americans. The demand for beaverskins was not so much for wraps as for fur felt used in making hats -- "beaver" was slang for hat. But for the period from ca. 1800 on, the most important demand on the region's fauna was not for fur at all, but for dressed deerskins used in making buckskin clothing. Buffalo robes were another important commodity in the Minnesota Valley Indian trade. Perhaps it would be better to substitute "peltry trade" for "fur trade."

The French withdrew their traders from the Minnesota country in the 1740's and the trade was not resurrected until the British North West Company took over following the French and Indian War of 1754-1763. There were no large posts located among the Santee, although North West Company engagees no doubt visited the Mdewakanton and Wahpeton villages and some bourgeois, like "Pinchon," probably wintered on the St. Peter's.

The Louisiana Purchase brought the Minnesota Valley under United States rule and handed control of the regional peltry trade to John Jacob Astor's American Fur Company (AFC). From the 1820's until the company failed in 1842, the AFC held a veritable monopoly on the Minnesota Indian trade; afterward, the trade was in the hands of former American Fur Company partners like Henry Hastings Sibley, who headed various joint ventures in the Sioux country until the early 1850's.

The AFC was "big business" in the best American tradition. In addition to its monopoly of the peltry trade the company dabbled in everything from minerals to fisheries; it manufactured the bulk of its own trade goods and

maintained a vast network of trading houses, depots, and factories stretching from the Great Lakes to the Pacific. Many of the company's engagees were themselved quite diversified, dealing in real estate, river transportation, and other businesses. Recognizing the great geographical and cultural diversity of its empire, the AFC divided its peltry operation into departments, which were themselves sub-divided into "outfits," of which the Western or Sioux Outfit was responsible for the posts along the St. Peter's.

Throughout its history, the Minnesota Valley trade retained a very pronounced French flavor. The principal bourgeois were men like Jean Baptiste Faribault and Louis Provencalle and their sones. French Canadian names dominated the muster rolls of both the North West Company and the American Fur Company as engagees, voyageurs, and commis. Generally, the French got on better with the natives than did the Bostonais (Angle-Americans), intermarried with them rather freely and more readily adopted native ways. The importance of kin ties in the peltry has been greatly underestimated by historians.

The early maps and travellers' accounts of the region are filled with French place-names. The site of Shakopee was Prairie des Francais, so named, Beltrami tells us, "from the first Frenchmen who pushed their discoveries from Canada to this spot, where they were killed by the Indians" (1828:307); Little Rapids was Batture aux Fievres, literally Fever Bottoms; nearby, at the site of present-day Chaska, was the Petite Prairie, Little Prairie. Names like Belle Plaine and Traverse des Sioux ("Sioux crossing") are preserved on modern maps. The Big Woods were Bois Franc, a reference to its deciduous forest (Winchell 1888:115).

The Minnesota Valley peltry trade probably peaked sometime during the 1830's and went into a rapid decline thereafter. There were many reasons for the collapse of the trade, economic, political, and environmental. The 1840's were characterised by inflation in the price of trade goods and a recession in the demand for pelts. Severe economic depressions, like the panic of 1837, forced many traders to seek their fortunes elsewhere; under Ramsey Crooks the American Fur Company itself fell on hard times, finally going under in 1842. Depletion of game resources along the Lower Minnesota River was a serious problem for the traders at Little Rapids and Traverse des Sioux; the decimation of the Indian population by disease was a significant factor, perhaps the most significant factor --

> Without exaggerating greatly, one might argue that the Upper Mississippi Valley fur trade in its final stages collapsed not from depletion of the wild game but for lack of Indians. Bad winters and periods of starvation they had always known and somehow survived, but the effects of disease and liquor and the demoralization that accompanied the destruction of their culture so decimated the Indian labor force that it simply could not support a trade of any great extent. (Gilman, 1970: 138-139).

The Treaty of Traverse des Sioux (1851), by which the Mdewakanton and Wahpeton ceded their lands west of the Mississippi River, was the last act in what Gilman has described as an "elaborate charade . . . the political and diplomatic window dressing necessary to disguise a subsidy to the fur companies for persuading or coercing their customer-employees [the Indians] to come docily to the treaty table" (1970:124). The peltry trade became the "Indian trade," almost wholly dependent upon public moneys for its existence -- the traders not only skimmed the annuities given to the Indians, they also received direct payments from the federal government.

The debilitating effects of the peltry trade on the region's indigenous inhabitants have been noted by many historians, although the environmental destruction wrought by the traders and their Indian clients has perhaps been underestimated by historians. Many of the traders no doubt thought it was a clever move to make the Indians dependent on them -- firearms were a key element in the trade simply because the Indians could not manufacture their own guns and ammunition and were thus unable to subsist without the trade. Scarcity of game, combined with a recession in the demand for peltry and higher costs for trade goods, drove many of the Santee bands to the brink of disaster. Philander Prescott's report that the Little Rapids had been driven to "desperation" by high ammunition prices (Stipe 1968:84) is echoed by other observors, some of whom predicted the extinction of the natives within a generation.

By killing off, or causing to be killed off, the local deer and buffalo herds, the traders forced the Indians to significantly alter their lifeways. In its least destructive form, the peltry trade reshaped the social organization of the bands and altered their subsistence patterns; in its most destructive form, it caused starvation. We might liken the massacre of the Minnesota Valley deer herds to the great wastage of buffalo by a later generation on the Great Plains.

The traders also inevitably brought with them the germs of exotic diseases to which the Indians had little resistance. Keating tells us that syphilis and smallpox were unknown in the Minnesota country before the building of Fort Snelling (1835:421-432); this is perhaps more than a slight exaggeration. Smallpox, which was also a scourge of the traders and their families, was the worst: it decimated the Santee, sometimes carrying off half the population of

the bands infected. Measles and scarlet fever were ever-present; periodic epidemics of typhus and other fevers were frightfully destructive; syphillis and alcoholism were endemic. The impact of European-introduced diseases on the native settlement and subsistence patterns, and on the peltry trade, was nothing less than catastrophic.

Little Rapids

After Mendota and Traverse des Sioux, Little Rapids was the most important trading area on the Lower Minnesota River. There is apt to be some confusion as to what is meant by posts "at Little Rapids," inasmuch as the records at hand would seem to suggest that the place so designated stretches along both sides of the river from about the neighborhood of Belle Plaine down to Chaska. The difficulty seems to be that the Frenchmen who traded there were accustomed to speak in the same way of a settlement or district covering many miles as Anglo-Americans would of a single village or town. This peculiar custom prevails today, in the French-speaking parts of Quebec and Louisiana. Unless this custom of calling by a single name, as if it were one post or a single village, an attenuated and dispersed collection of native hamlets, individual dwellings, and trading stations is borne in mind, the documentary record is almost incomprehensible.

The earliest recorded trading posts at Little Rapids date from the 1820's. Pile noted that the location would have made a good site for a post, although it is not clear whether or not there was or had been a trader resident there at the time of Pike's expedition (Coues 1965:346-347). Louis Provencalle, nicknamed "Le Blanc," maintained a post at Little Rapids from 1823 until 1825 or 1826, when he moved his operation to Traverse des Sioux (Babcock 1939:263-264). James Lockwood writes of trading with the

Gens des Feuilles at Little Rapids and wintering there in the 1820's (Lockwood 1856:186). Jean Baptiste Faribault, having come up from Prairie du Chien in 1820, built his establishment at Mendota in 1826; he wintered at Little Rapids (Neill 1882:200), where he was licensed to trade at a post called Fort Lewis in 1826 (Taliaferro, Lawrence PAPERS; Neill 1889:114). In 1828-1829 the elder Faribault was joined at Little Rapids by his son, Alexander, who had previously traded at Traverse des Sioux (Babcock 1939:265). The Faribaults maintained their posts at Little Rapids until ca. 1850, when Oliver abandoned his settlement at Chaska in favor of Shakopee.

That the Little Rapids trade was quite profitable is shown by Jean Baptiste Faribault's returns for the 1830-1831 season, in which he netted a return of more than four thousand dollars on a capital outlay of $2,461.93 (Taliaferro Papers); in another season, Oliver Faribault, whose compound at Little Prairie was described as "extensive" by one visitor, obtained fifteen hundred deerskins from the local bands in a single season. When the Panic of 1837 threatened to bring down Sibley's Western or Sioux Outfit, Little Rapids was one of only three posts kept open (Gilman 1970:129). Louis Robert, a merchant of astute business acumen, maintained a rather extensive trading operation at Little Rapids between 1850 and 1854 (Hughes 1905:135; Upham 1920:511).

While the Provencalles, Faribaults, and Sibleys were busy converting pelts, a number of missionaries attempted to convert the souls of the Gens des Feuilles. The Rev. Stephen R. Riggs was unsuccessful in his attempt to plant a mission at Little Rapids in 1841; he did better with the other Wahpeton band, at Lac-qui-Parle (Riggs 1880:75; Belgan 1940:170, 172).

Father Augustin Ravoux was invited to little Rapids by the Faribaults and built a chapel at Petite Prairie (Chaska) in the summer of 1843; the local Indians were not impressed and Ravoux abandoned his mission the following spring, having the chapel rafted downriver to Shakopee (Ravoux 1892:4; Coller 1960:13-14). The Rev. Samuel Pond did manage to erect a permanent mission at Shakpe's village (Taoapa) and remained at "Prairieville" (Shakopee) for many years (Creswell 1906:86).

Sometime before Thomas Holmes arrived in 1851, Oliver Faribault removed his trading house and French Canadian associates to Shakopee. Captain Louis Robert arrived at the Little Rapids in 1850 and built a post near the Wahpeton village across the river from Faribault's establishment at Chaska (Minnesota Register, 1 July, 1850). When the steamboat Anthony Wayne ascended the Minnesota River in June, 1850, it stopped to unload cargo at Robert's post before proceeding upriver. Above the rapids, the Anthony Wayne turned around and headed back downriver; running short of fuel, the captain decided to put ashore somewhere in the vicinity of Robert's post, where the crew vandalized an Indian cemetery and tore down the log house and surrounding picket of an abandoned fur post, "showing our contempt for the age that has past" (Minnesota Chronicle and Register, 1 July, 1850). This unlucky post cannot be identified with any in the historical record.

With the coming of settlers to Fuller's Chaska townsite, the local Wahpeton band moved a short distance upriver, followed by Captain Robert, who built two "comfortable" log houses back from the river on the Dismal Swamp Road sometime around 1852 (Upham 1920:511; Minnesota Democrat, 7 June, 1854). Here he also attempted to plant a town: Louisville. Unfortunately, no one came to settle there and the town never evolved beyond a signboard on

the riverbank (Saint Anthony Express, 10 June, 1854).

Chaska

It was not a great step from the peltry trade to land speculation and Thomas Holmes was perhaps typical of the last generation of traders in the Minnesota Valley. In 1851 Holmes obtained a license from the Indian Agent at Fort Snelling to locate on the Minnesota River; he stopped first at Prairieville, there to plant the seed for the future town of Shakopee, and then proceeded to Little Rapids, where he staked out a claim on the Petite Prairie. In the fall of 1851, a Yankee hosteler from Saint Paul named David Fuller became infected by what Neill called the "prevailing epidemic" of the times: land speculation. He talked with Holmes and in 1852 purchased the Chaska site for $1,000. The first settlers, mostly Germans from Saint Paul, arrived in 1853 and claimed their land under the Pre-Emption Act. Settlers took out lots and raised houses under contract with the "Shaska Land Company" ("the name 'Chaska' was thus mis-spelled in the act of incorporation of the company"). The town was surveyed and platted in 1854 by John T. Halsted, with a government survey in 1856. The Shaska Land Company and its Yankee capitalists ceased being the sole proprietors of the town after 1857 and in 1871 the village was incorporated. (Shaska Company 1857; Hood 1857; Neill 1882:357-359; Upham 1920:82).

Chaska's economic growth is described in the SHPO study, Carver County: A Guide to Its Historic and Prehistoric Places --

> Within a decade after settlement, Chaska's industrial and commercial growth was exceeded only by Carver's. The town's major business was government. As the county seat, it provided farmers on 'government business' with retail stores, mills to grind their wheat and cereal crops, and numerous hotels and saloons. It also attracted new settlers. In 1866, a boom year for the town, eight more additions were made to the original plat and over thirty new building were constructed. The town that year shipped 7,000 cords of wood, 400,000 hoop poles, 93,000 bushels of grain, and, as a preview of what was to become the town's major industry for over

> half a century, 800,000 locally manufactured bricks. Two breweries were built in 1866 (one of which, the Beyrer Brewery, still remains); they were part of Chaska's second major industry. The pace of growth and prosperity continued until the 1880's. (1978:38-39).

The people who settled Chaska were mostly Germans, plat maps and other records show a heavy influx of Scandinavian immigrants in the 1870's. Very early in its history, the town evolved into an important regional transportation and agricultural center. In 1874 the Hastings and Dakota Railroad linked Chaska with Saint Paul; in the following two decades rail links were established with the southern and western settlements. Cereal and lumber products were milled, stored, and shipped by rail and water, leading to the creation of a thriving commercial district and a business community with extremely strong ties to the agricultural hinterland.

"The brick industry dominated Chaska's industrial activity during the 1880's and 1890's," write Lofstrom and Spaeth --

> By 1882, eleven yards were in full operation; they turned out 300,000 bricks each day. Many public buildings throughout the state were constructed of the famous 'Chaska brick,' as were buildings at Fort Snelling and the Minneapolis sewer system. Numerous buildings in the Chaska area were also, of course, constructed of the brick. Seventeen of them are located within the Walnut Street District. (1978:41).

Winchell located the brickyards on the eastern edge of town, about thirty-five feet above low water, approximately one half-mile west of the railroad bridge (1888:141). These works employed several hundred men on a seasonal basis and must have consumed an enormous amount of wood, certainly a significant contributor to the destruction of the Big Woods. The brickyards have now disappeared, the clay pits filled in and built over.

5. Field Methods

The field survey of the three diversion channel segments surveyed under this contract were first examined by a walking surface survey after property owners had been contacted for the necessary permission. This surface survey was followed by the shovel testing of the three right-of-ways as described below. Map 2 illustrates the surface cover of the three areas and shows clearly the degree of current impact in the West Chaska Creek and Alternative 3 divisions. Alternative 2 was the only one where surface structures and other land modification activities had not seriously affected the surficial soils. Photographs of these right-of-ways demonstrate these areas of impact. The photographs appear as figures following the text of this report.

The areas shovel tested included all segments of the three proposed diversion channels where access was possible and where severe surface disturbance did not preclude intact soil horizons. Complete soil profile logs were recorded for each shovel test and these are included in Appendix B. Project maps found in the end pocket of this report record the location and number of each shovel test.

The location of the proposed diversion channel for West Chaska Creek lies largely within the actively working floodplain of the Minnesota River and West Chaska Creek. The portion of the channel lying between its point of beginning south of the corner of Hickory and First Street and its intersection with First Street immediately south of TH 212 is flat with only minor surface undulations. The soils are alluvial, primarily silt and clay loams. The portion of the proposed diversion channel between First Street south of TH 212 and its end lies at the base of the bluffs overlooking the floodplain. This area contains primarily silt loam type soils. The first portion of the channel has not been

disturbed by modern construction and has not been encroached upon by construction. The second portion has been heavily disturbed by the construction of two sets of railroad tracks, houses, and businesses.

Alternatives two and three lie on a second and third terrace above the actively working flood plain. The second terrace contains moderately deep silty-loam soils. The third terrace contains soils derived from the marsh that dominates the area. The eastern half of Alternative two lies within the floodplain of East Chaska Creek and the soils here are silt loams. The portions of Alternative three which lie west of County Road 17 and south of TH 212 have been heavily impacted by modern construction. The remainder of Alternative three and all of Alternative two have not been impacted. However, the portion of Alternative two west of the Chicago and Northwestern Railroad tracks is marshy with standing water.

Field methods were straightforward. The three localities were initially walked to locate any above ground features such as mounds, foundations, or historic structures. Areas which were not heavily impacted were then shovel tested. Tests were dug 20m on either side of the proposed centerline (and every 15m along the alignment), and the soil was screened through quarter inch mesh. Shovel tests were 50 cm square and excavated to a C horizon soil except at the terminal points of West Chaska Creek and Alt. 3 where floodplain alluvium occurs. Field logs showing the profile of each test were kept and the location of each test was plotted on the project maps provided by the Corps of Engineers. Three areas were heavily impacted and in these shovel tests were dug along the centerline at 15m intervals. These areas are the portion of the West Chaska Creek diversion east of its intersection with First Street; the portion of Alternative three west of County Road 17; and the portion of Alternative south of TH 212. Property owners, the Chaska City

Manager, and other individuals were interviewed to determine whether prehistoric cultural materials have ever been found in any of the three areas.

The pedestrian surface survey covered 100% of the project alignments; the shovel tests consisted of an approximate 20% sample of all right-of-way in areas where shovel tests were possible. Shovel test placement was by aligned regular intervals as described above. Shovel tests were prohibited by a refusal of permission by a land owner in only one small segment of Alt. 2 where a crop of winter wheat had been planted. This segment is shown on the end pocket map. Negative shovel tests on either side of that restricted area suggest that it also is devoid of cultural resources, confirming the negative evidence obtained in the pedestrian survey.

The results of the field reconnaissance were completely negative. No prehistoric materials were recovered from any of the three areas. No mounds, formations, or historic structures exist within any of them. No cultural materials (excluding fragments of modern glass, cans, and wire) were found in any of the shovel tests.

However, the portion of Alternative three lying between TH 212 and elevation 860 may contain buried cultural materials deeper than three feet. Such materials may also exist in the portion of the West Chaska Creek diversion between its point of beginning and its intersection with First Street. Deep flood plain alluvium in these two areas may overlie cultural resources of the early historic period. While there was no direct evidence for this in the tests or in data provided by the literature search, it is suggested that if deep testing using mechanical equipment is undertaken for the portions of those channels on the flood plain, similar deep testing should be undertaken in these two areas as well.

6. Laboratory Methods

There are no artifact collections or other objects of cultural significance from this survey. All field notes, maps, original soil profile records, and photographic negatives are on file with statewide archaeological site records in the Wilford Archaeological Laboratory, Department of Anthropology, 215 Ford Hall, University of Minnesota, Minneapolis. All materials in these files are available to scholars conducting research pertinent to the data.

7. Investigation Results

No cultural resources of significance were located within the right-of-way of the segments of three proposed diversion channels examine under this contract. There is a possibility, probably quite slim, that there may be deeply buried resources in two localities on the flood plain. These areas lie adjacent to the juncture of West Chaska Creek and the present flood plain. This possibility is not based on specific evidence and should be considered speculative.

The literature search documents considerable evidence for the presence of historic sites, structures, and locations in the general Chaska area. One or more of these may exist in the proposed right-of-ways of Alternatives 1, 4 and 5 which are still to be surveyed at some time in the future. Which of these, if any, do exist in those areas can only be determined by field test excavations. Literature search and record examination do not reveal exact locations for the earlier historic sites.

8. Recommendations

The literature search, records review and field testing all produced negative evidence of cultural resources in the project area. There will be no direct or indirect impact on cultural resources nor are there sites present which have potential for nomination to the National Register of Historic Places. No further cultural resource investigation of the project area is recommended.

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APPENDIX A
SCOPE OF WORK
FOR A CULTURAL RESOURCE
INVESTIGATION OF LANDS
AFFECTED BY A PROJECT FOR FLOOD
CONTROL AT CHASKA, MINNESOTA
ALONG THE MINNESOTA RIVER

1. INTRODUCTION

1.01 The Contractor will undertake a cultural resources reconnaissance inventory of lands in and adjacent to the City of Chaska which will be affected or altered by a U.S. Army Corps of Engineers flood control project. This cultural resources inventory is in partial fulfillment of the obligations of the St. Paul District regarding cultural resources, as set forth in the Historic Preservation Act of 1966 (P.L. 89-665), the National Environmental Policy Act of 1969 (P.L. 91-190), Executive Order 11593 for the Protection and Enhancement of the Cultural Environment (13 May 1971, 36 C.F.R. 8921), The Archaeological Conservation Act of 1974 (P.L. 93-291), the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), the Department of the Interior's guidelines concerning cultural resources (36 C.F.R. Part 60), and Corps of Engineers Regulations (ER 1105-2-460) "Identification and Administration of Cultural Resources" (Federal Register 3 April 1978).

1.02 The above mentioned laws establish the importance of Federal leadership, by the various responsible agencies, in locating and preserving cultural resources within project areas. Specific steps to comply with these laws, particularly as directed in P.L. 93-291 and E.O. 11593, are being taken by the Corps "...to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural, or archaeological significance." A part of that responsibility is to locate, inventory, and nominate to the Secretary of the Interior all such sites in the project area that appear to qualify for listing on the National Register of Historic Places.

1.03 The Executive Order further directs Federal agencies "...to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished or substantially altered." In addition, the Corps is directed to administer its policies, plans and programs in such a way that federally and non-federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved and maintained for the inspiration and benefit of the people.

1.04 This cultural resources investigation will serve several functions. The report will be a planning tool to aid the Corps in meeting its obligations to preserve and protect our cultural heritage. It will be a comprehensive, scholarly document that not only fulfills federally mandated legal requirements but also serves as a scientific reference for future professional studies. It will identify sites which may require additional investigations and which may have potential for public-use development. Thus, the report's content must be analytical in nature, not just descriptive.

2. PROJECT DESCRIPTION

2.01 The City of Chaska is located in eastcentral Minnesota at the confluence of Chaska and East Chaska Creeks with the Minnesota River. The lower parts of the city are subject to flooding from the Minnesota River. The two creeks also flood parts of the city behind the existing levee which protects Chaska from floods on the Minnesota River.

2.02 The proposed plan of flood control consists of diverting Chaska Creek and bypassing flood flows of East Chaska Creek around the heavily developed areas of the city, combined with the upgrading and extension of the existing emergency levee. The diversions would require earthen embankments to divert flood flows into rock-lined channels which would carry flows to the Minnesota River flood plain.

3. DEFINITIONS

3.01 For the purpose of this study, the cultural resources investigation will include a literature and records review, and a Phase I on-the-ground reconnaissance level survey. Phase II testing will not be conducted at this time.

3.02 "Cultural resources" are defined to include any building, site, district, structure, object, data, or other material relating to the history, architecture, archaeology, or culture of an area.

3.03 "Literature search" is defined as an examination and review of written reports, books, articles, etc., published and unpublished, which are pertinent to the cultural resources investigation to be carried out for a particular project. The purpose of the literature search is to familiarize the Contractor with the cultural history of the study area and past investigations which have been carried out in the area, and to provide this information in a summarized form to the agency requesting the search. While the existing data could be extensive, the literature search should be as comprehensive as possible in providing a usable body of data for the purposes outlined above.

3.04 "Records review" is defined as the examination and review of records, files, etc., which are maintained by various local and State agencies. The purpose of the records review is to document the location of known sites which may exist within the project area, their condition, the extent of past work undertaken at the site, and any other information which may be relevant in assessing the significance of the site.

3.05 "Phase I cultural resources survey" is defined as an intensive, on-the-ground survey and testing of an area sufficient to determine the number and extent of the resources present and their relationship to project features. A Phase I cultural resources survey will result in data adequate to assess the general nature of the sites present; a recommendation for additional testing of those resources which, in the professional opinion of the Contractor may provide important cultural and scientific information; and detailed time and cost estimates for Phase II testing.

3.06 "Phase II testing" is defined as the intensive testing of those sites which may provide important cultural and scientific information. Phase II testing will result in data adequate to determine the eligibility of the resources for inclusion on the National Register of Historic Places, a plan for the satisfactory mitigation of eligible sites which will be directly or indirectly impacted, and detailed time and cost estimates for mitigation.

4. STUDY AREA

4.01 The literature search conducted by the Contractor will be concerned with the prehistoric and historic character of the City of Chaska and its immediate surrounding areas as outlined on the inclosed map. Special attention will be given to the location of early historic trading posts in the area.

4.02 The Contractor will conduct on-the-ground surveys in the following areas (refer to the inclosed map for more detail):

a. The proposed location of Alternatives 2 and 3 of the East Chaska Creek Diversion Channel. Right of way limits are 100 feet on either side of the proposed channel centerline.

(1) On-the-ground survey of Alternative 2 begins at the bluff of the Minnesota River Valley and ends at elevation 750 just south of TH 212.

(2) On-the-ground survey of Alternative 3 begins at the bluffs of the Minnesota River Valley and ends at elevation 750.

b. The proposed location of the diversion channel for West Chaska Creek beginning at the present creek channel south of First Street and ending at TH 212. Right-of-way limits are 100 feet on either side of the proposed channel centerline.

5. PERFORMANCE SPECIFICATIONS

5.01 The Contractor will utilize a systematic, interdisciplinary approach in conducting the study. The Contractor will provide specialized knowledge and skills during the course of the study to include expertise in archaeology and other social and natural sciences as required. Personnel involved with the work under this contract must meet the minimum professional qualifications outlined in Appendix B.

5.02 The extent and character of the work to be accomplished will be subject to the general supervision, direction, control, and approval of the Contracting Officer.

5.03 Techniques and methodologies used during the investigation shall be representative of the current state of knowledge for their respective disciplines.

5.04 The Contractor shall keep standard field records which shall include, but not be limited to, field notebooks, site survey forms, field maps, and photographs.

5.05 The tested areas will be returned as closely as practical to presurvey conditions.

5.06 The recommended professional treatment of recovered materials is curation and storage of the artifacts at an institution that can properly insure their preservation and that will make them available for research and public view. If such materials are not in Federal ownership, the consent of the owner must be obtained, in accordance with applicable law, concerning the disposition of the materials after completion of the report. The Contractor will be responsible for making curatorial arrangements for any collections which are obtained. Such arrangements must be coordinated with the appropriate officials of Minnesota and approved by the Contracting Officer.

5.07 Should it become necessary in the performance of the work and services, the Contractor shall, at no cost to the Government, secure the rights of ingress and egress on properties not owned or controlled by the Government. The Contractor shall secure the consent of the owner, his representative, or agent, in writing prior to effecting entry on such property. If requested, a letter of introduction signed by the District Engineer, can be provided to explain the project purposes and request the cooperation of landowners. Where a landowner denies permission for survey, the Contractor shall immediately notify the Contracting Officer and shall describe the extent of the property to be excluded from the survey.

5.08 When sites are not wholly contained within the right-of-way limits, the Contractor shall survey an area outside the right-of-way limits large enough to include the entire site within the survey area. This procedure shall be done in an effort to delineate site boundaries and to determine the degree to which the site will be impacted.

Literature Search

5.09 Information and data for the literature search and records review will be obtained from, but not limited to, the following sources:

a. Published and unpublished reports and documents such as books, journals, theses, dissertations, manuscripts, newspapers, W.P.A. reports, surveyors' maps and notes, early atlases, and missionary records.

b. Site files and other information held at the Minnesota Historical Society Libraries, Archives, and Archaeology Department; the State Archaeologist's Office; the University of Minnesota Department of Anthropology and libraries; and materials available from the Carver County Historical Society and other local historical societies.

c. The Contractor will obtain from the State Historic Preservation Office information regarding any cultural resources in the project area that have been nominated or are being considered for nomination to the National Register of Historic Places.

d. Consultation with other professionals familiar with cultural resources in the area.

e. Consultations with amateur archaeologists and individuals concerned with local history in order to locate sites and to identify and define local interests and resources perceived to be locally significant.

5.10 A study and evaluation of previous archaeological and historical studies of the region, including the date, extent, and adequacy of the past work as it reflects on the interpretation of what has been done in the area should be undertaken and summarized in the report.

5.11 The literature search should include a listing of all sites (historic and prehistoric) identified during the course of the study and an evaluation of the impact upon them of the proposed project.

Phase I Survey

5.12 The on-the-ground examination will be a reconnaissance level survey and shovel testing of the area of sufficient intensity to determine the number and extent of cultural resources present. This includes standing structures as well as historical and prehistorical archaeological sites.

5.13 An attempt will be made to locate all resources previously recorded that are located in the project area as described in section 4.01 and that may be impacted by the proposed project, and to report their condition.

5.14 The survey shall include surface inspection in areas where surface visibility permits adequate recovery of cultural materials and subsurface testing where surface visibility is limited. Subsurface investigation may include test pits, corings, or cut bank profiles where appropriate.

5.15 The recommended grid or transect interval is 15 meters (50 feet). However, this interval may vary depending upon field conditions. If the recommended interval is not used, justification should be presented for selection of an alternate interval. All tests will be screened through 1/4-inch mesh.

6. GENERAL REPORT REQUIREMENTS

6.01 Upon completion of field work, the Contractor will submit to the Contracting Officer a brief report detailing the work accomplished. Upon completion of all field investigations and research, the Contractor shall prepare a technical report detailing the work done, the results, and the recommendations for testing and associated time and cost estimates for those resources found to have potential for the National Register.

6.02 The technical report shall include, but not be limited to, the following sections. These sections do not necessarily need to be discrete sections; however, they should be readily discernable to the reader.

a. Title page: The title page should provide the following information: the type of survey undertaken (reconnaissance, intensive); the cultural resources assessed (archaeological, historical, architectural); the project name and location (county and State); the date of the report; the Contractor's name; the contract number; the name of the author(s) and/or Principal Investigator; the signature of the Principal Investigator; and the agency for which the report is being prepared.

b. Administrative Summary: The summary will be a synopsis of the report, defining the project area and the level of the cultural resources investigation. It shall summarize the research objectives and problems, methods, numbers, and types of resources identified, the significant recommendations, and any unusual or innovative findings or techniques developed during the course of the investigation. Because this information will serve both as an administrative summary and as a portion of that information required by the Department of the Interior for its annual report to Congress (pursuant to Section 5.c. of the Reservoir Salvage Act as amended), the summary should be as detailed and succinct as possible. Normally, the summary will not exceed one typewritten page.

c. Table of Contents.

d. Introduction: This section should include the purpose of the report; a description of the proposed project; the location of the proposed project, including a map of the general area; and a project map (a list of USGS quadrangle maps which cover the project area should also be included); and the dates during which the field survey was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Setting: This section should contain a brief description of the environment of the study area, both present and past conditions, and it should be of a length commensurate with other sections of supporting type information.

f. Literature Search: This section should detail the sources used for the literature search and records review as well as a description of all information encountered. Bibliographic information should also be included at the end of the report.

g. Field Methods: This section should give an explicit statement of testing and survey methods and rationale. It should describe the areas which were surveyed (types of ground cover, degree of surface visibility, etc.) whether or not the survey resulted in the location of any cultural resources, the methods used to survey the area (pedestrian reconnaissance, subsurface test, etc.) the rationale for eliminating uninvestigated areas, the estimated size of the investigated sample and its relationship to the sample universe (e.g., 100 acres representing 15 percent percent of the project impact area), and the grid of transect interval used. Testing methods should include descriptions of test units (size, intervals, depth) and the rationale behind their placement.

h. Laboratory Methods: This section should explain in detail the laboratory methods employed and the rationale behind the method selected. This section should also contain references to accession numbers used for all collections, photographs and field notes obtained during the study, and the location where they are permanently housed.

i. Summary of Regional Prehistory and History: This section should discuss the regional cultural developments in their spatial and chronological position.

j. Investigation Results: This section should describe the historical as well as the prehistoric and historic archaeological resources encountered in the literature search and survey, with each site discussed as a separate unit. The site description should include the size of the site, type of site (i.e., historic dwelling, prehistoric village, mound group, etc.); the cultural component(s) of the site (if discernable); and the general nature of the site as it existed at the time of the survey. An inventory of cultural material recovered from sites may be included in this section or added to the site survey forms. Accession numbers for collected cultural material should be included as a part of the inventory. Inventoried sites shall include a site number. Official site designations assigned by an appropriate State agency are preferred. However, if temporary site numbers will be used in either the draft or final reports, they shall be substantially different from the official site designations to avoid confusion or duplication of site numbers.

k. Recommendations: This section should discuss the direct and indirect impacts that the proposed project will have on cultural resources. For those sites encountered, the Contractor shall make recommendations for the adequate assessments of those sites considered to have potential for eligibility to the National Register of Historic Places. This assessment will not proceed to the level described in paragraph 3.06. These recommendations should include a time and cost estimate. If it is the Contractor's assessment that no significant resources exist in the project areas, the methods of investigation and reasoning which support that conclusion will be presented. If certain areas are not accessible, recommendations will be made for future consideration. If it is found that significant resources do exist in the area, the report will describe the information recovered and where the resources were located, and will assess the extent and potential of the recovered information. Any evidence of cultural resources or materials which have been previously disturbed or destroyed will be presented and explained.

l. References: All references must follow American Antiquity format.

m. Appendix: This section should contain the Scope of Work and the resumes of the Principal Investigator and crew. State site forms shall also be included as an appendix.

n. All sites identified in the course of the study, including find spots and known sites, will be presented on State site forms as an appendix to the report. Data should also be provided about the present condition of the sites (disturbance by natural or manmade processes) and content of any collections from the sites. Known sites shall have their State site forms updated as necessary. All State site forms will be submitted to the State Archaeologist.

o. The location of all sites and other features discussed in the text will be shown on 8½ X 11 inch legibly photocopied USGS map sections and will be bound into the report. Project maps shall also be included as part of contract correspondence showing the relationship of sites to the project areas. Maps should also show the type of survey method employed for each area surveyed (example, pedestrian walkover, shovel tests) and formal test pits, if applicable. All maps will be labeled with a description, a north arrow, a scale bar, township and range (on USGS maps only), and the map source (e.g., the USGS quad name or published source).

p. Failure to fulfill these report requirements will result in the rejection of the report by the Contracting Officer.

7. FORMAT SPECIFICATIONS

7.01 Text materials will be typed (single-spaced or space-and-a-half) on good quality bond paper, 8.5 inches by 11.0 inches, with a 1.5-inch binding margin on the left, 1-inch margins on the top and right, and a 1.5-inch margin at the bottom. The report will be printed on both sides of the paper.

7.02 Information will be presented in textual, tabular, and graphic forms, whichever is most appropriate, effective, or advantageous to communicate the necessary information.

7.03 All figures must be readily reproducible by standard xerographic equipment.

7.04 Negatives of all black and white photographs contained in the final report must be included so that copies for distribution can be made.

8. SUBMITTALS

8.01 The Contractor will submit reports according to the following schedules:

a. Brief Field Report: The original and one copy will be submitted upon completion of field work.

b. Draft Final Report: The original and six copies will be submitted calendar days after contract award. The Contracting Officer will provide the Contractor with comments on this draft report.

c. Revised Final Report: The original and 15 copies will be submitted calendar days after contract award. This final report will include appropriate revisions in response to the Contracting Officer's comments.

8.02 The Contractor shall not release any sketch, photograph, report, or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer prior to the acceptance of the final report by the Government.

9. METHOD OF PAYMENT

9.01 Requests for partial payment under this fixed price contract shall be made monthly on ENG Form 93. A 10 percent retained percentage will be withheld from each partial payment. Upon approval of the final reports by the Contracting Officer, final payment, including previously retained percentage, shall be made.

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 2

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Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 2

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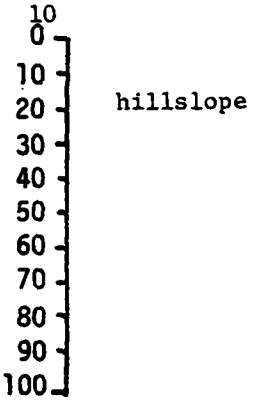

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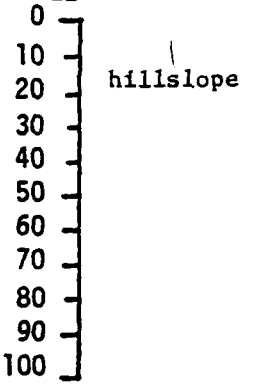

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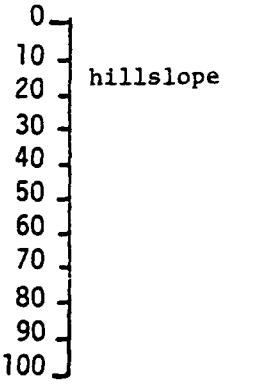

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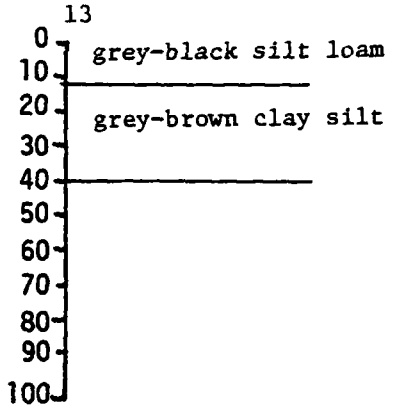

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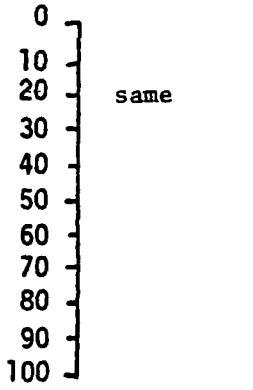

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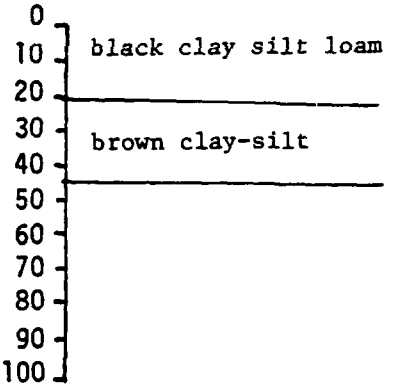

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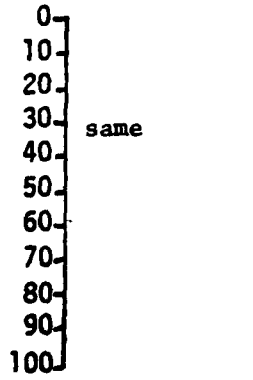

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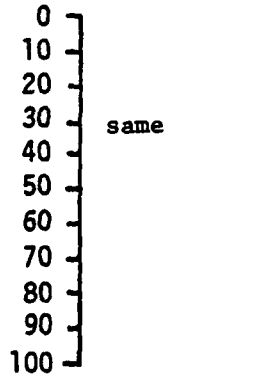

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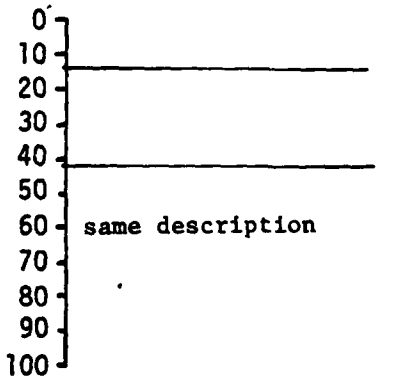


Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

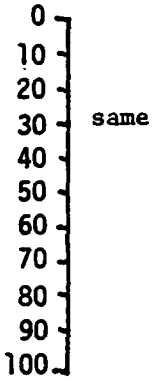
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 2

19



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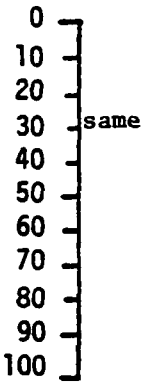

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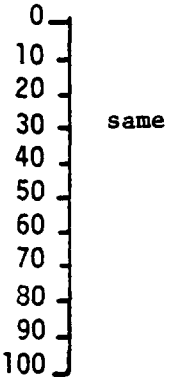

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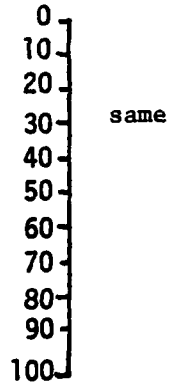

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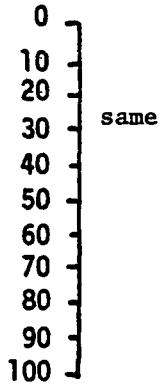

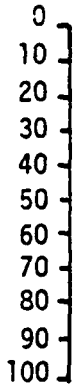

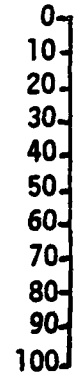

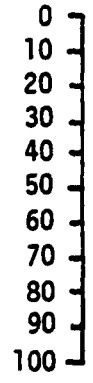

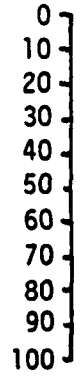

Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

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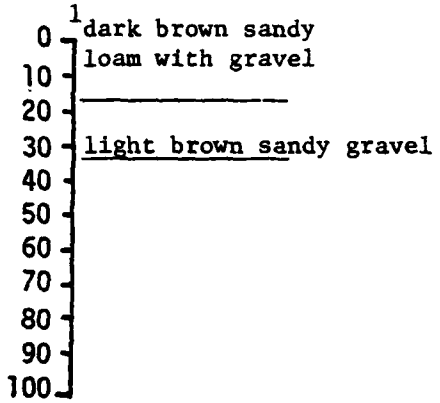

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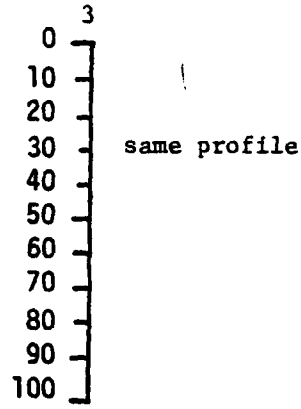

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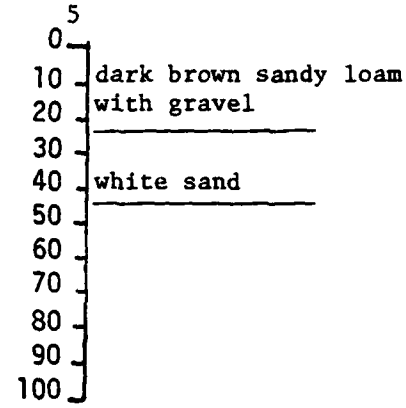

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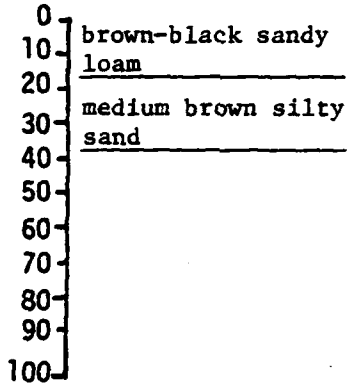

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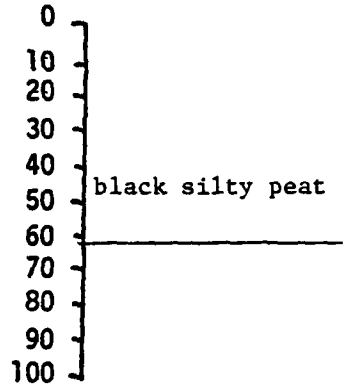

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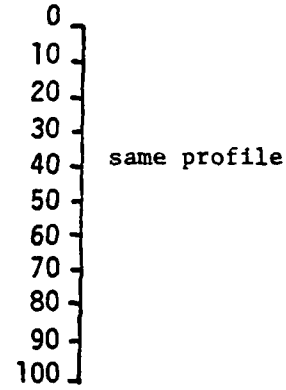

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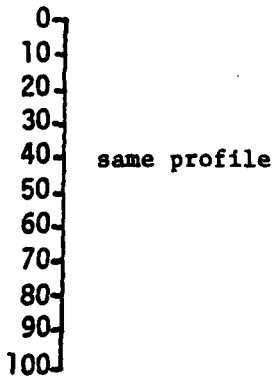

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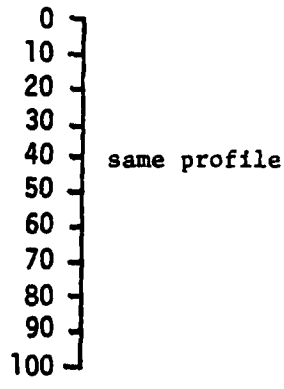

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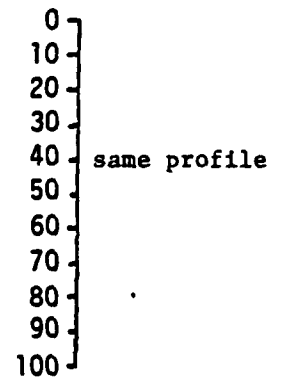

Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt 3

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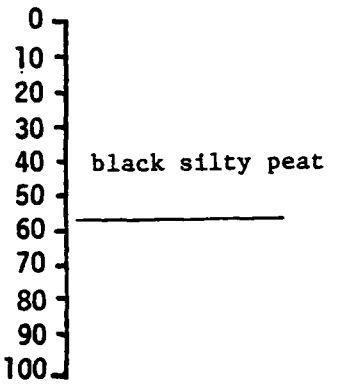

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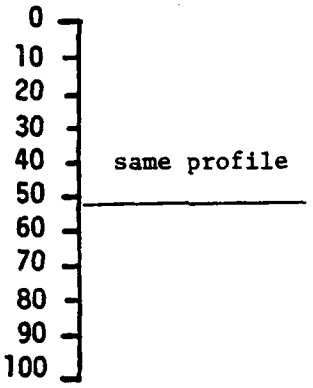

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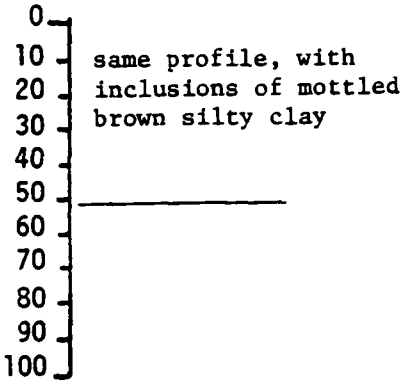

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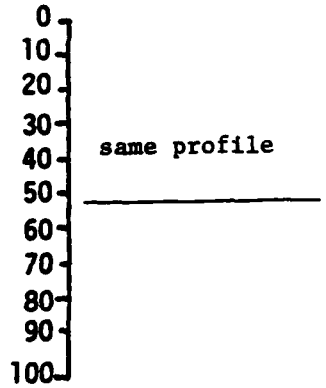

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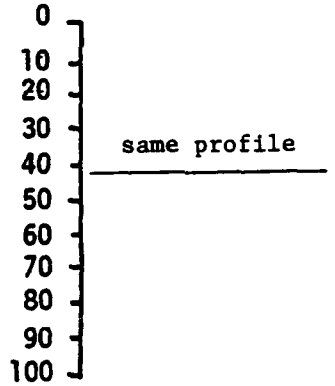

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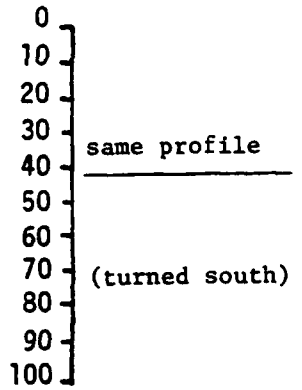

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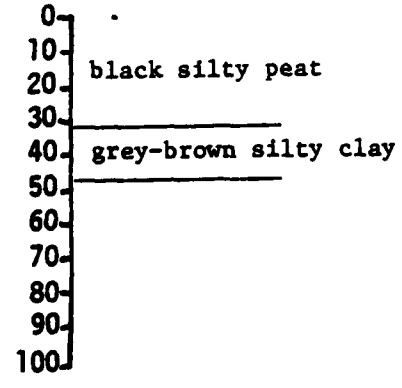

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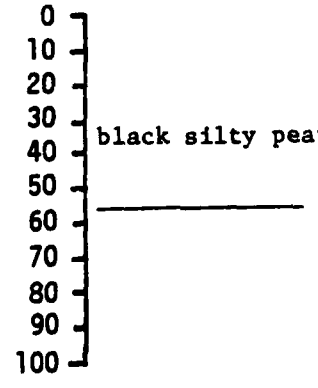

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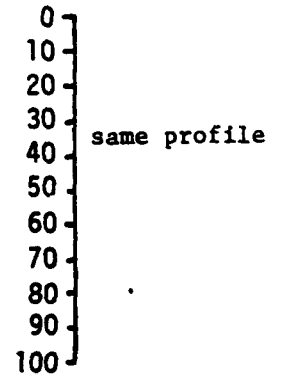

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Test unit size = 30 x 30 cm

By: _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

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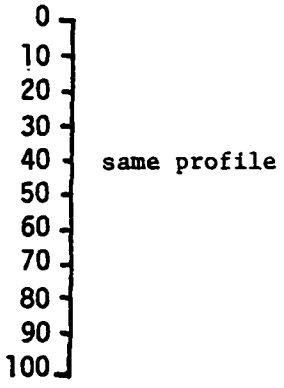

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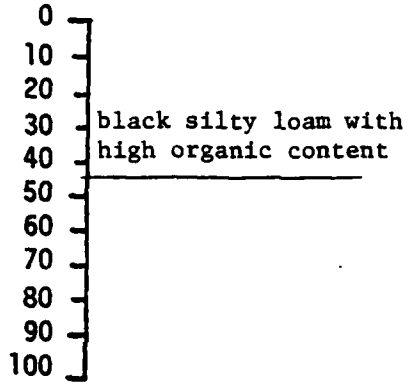

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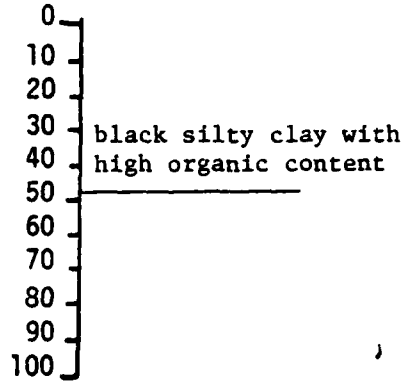

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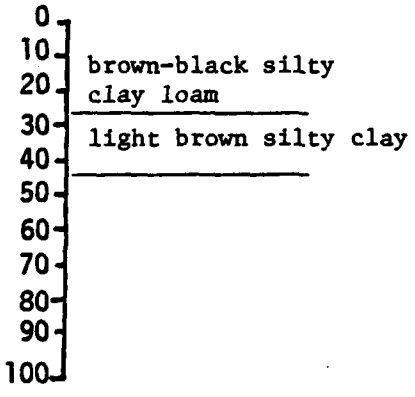

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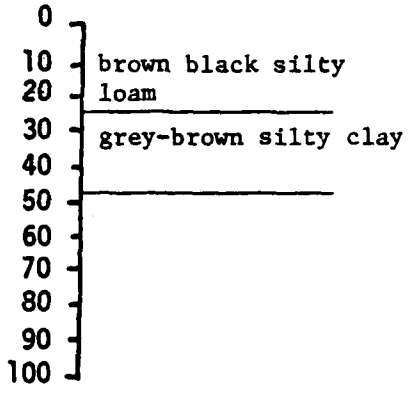

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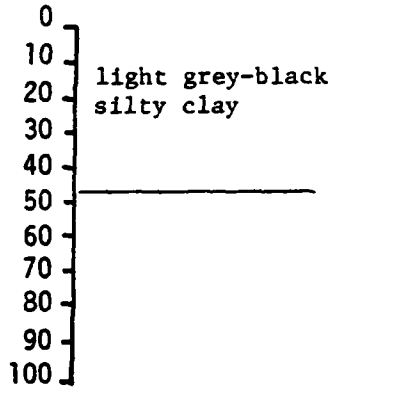

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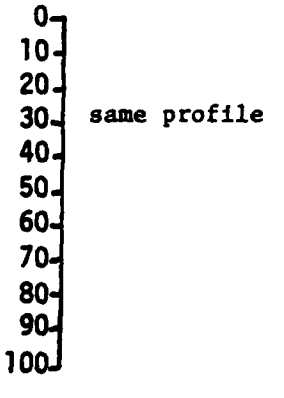

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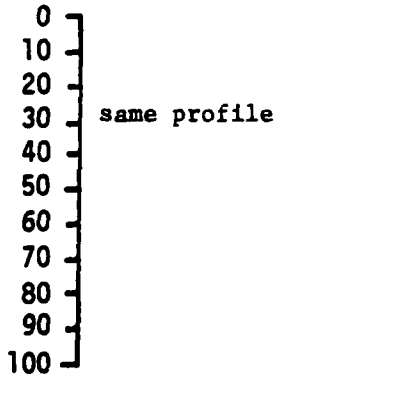

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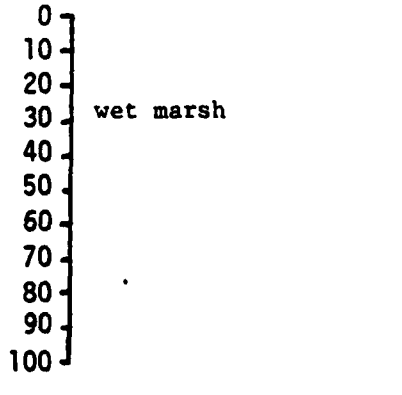

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Test unit size = _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

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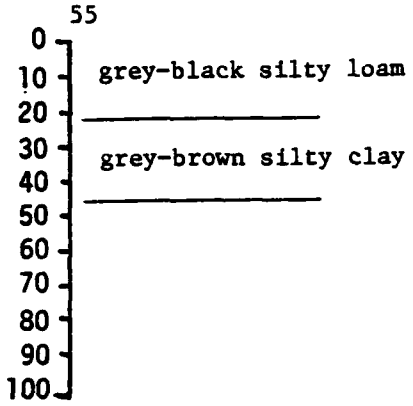

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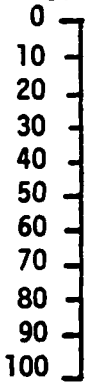

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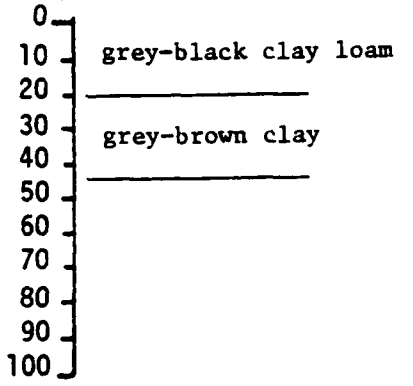

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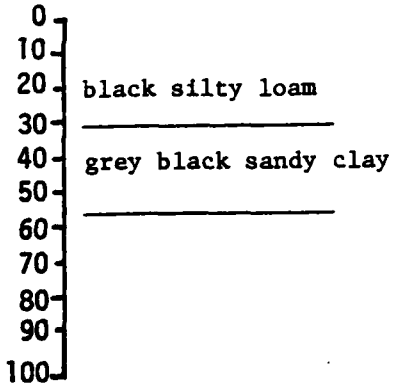

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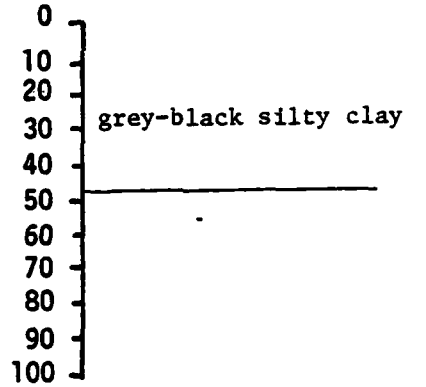

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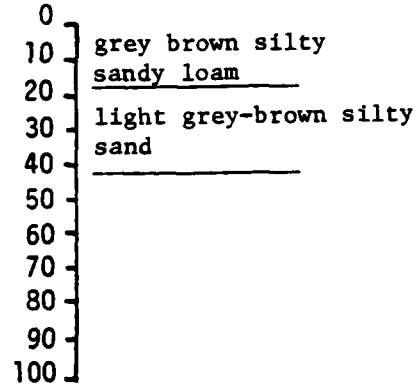

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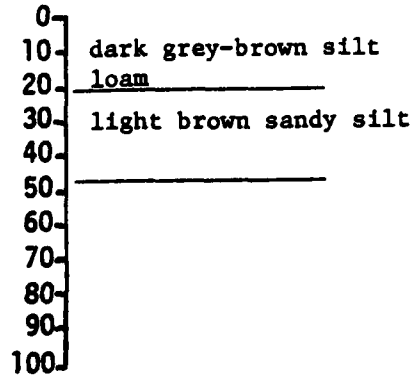

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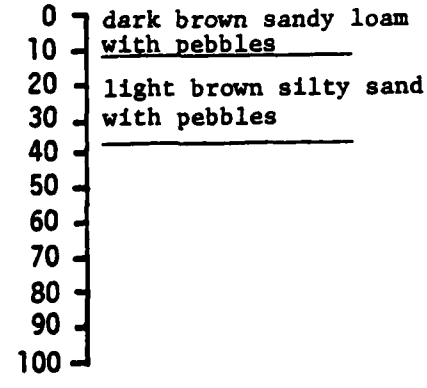

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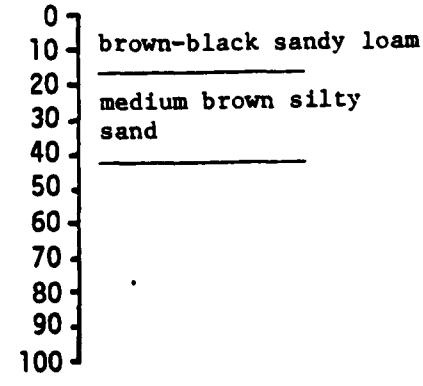

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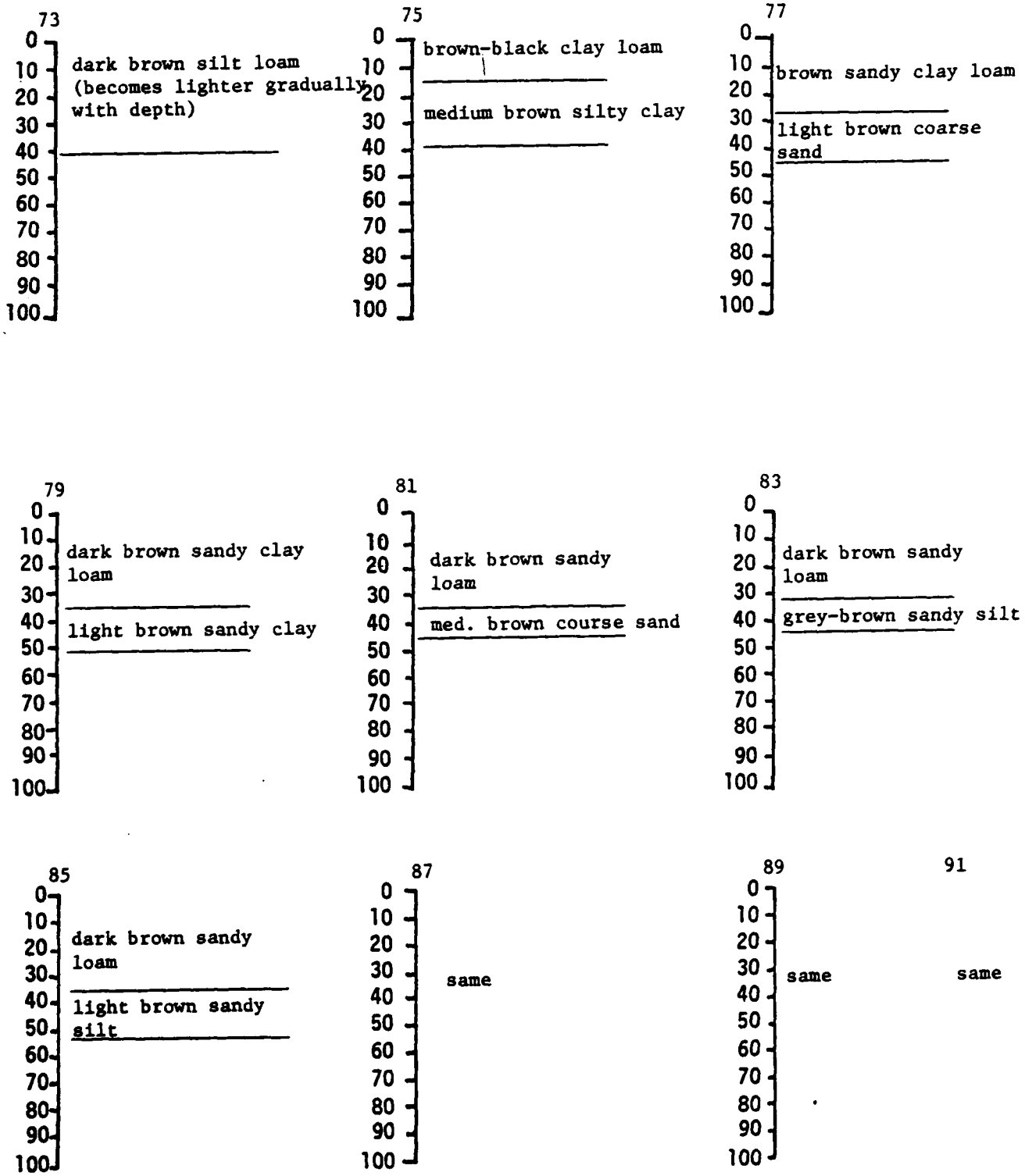
By: _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3



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Test unit size = _____

By: _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

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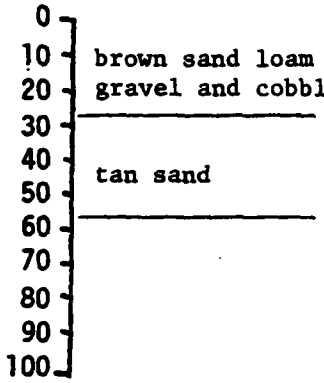

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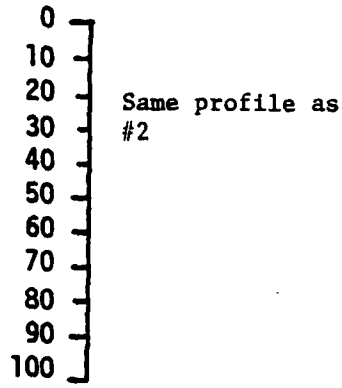

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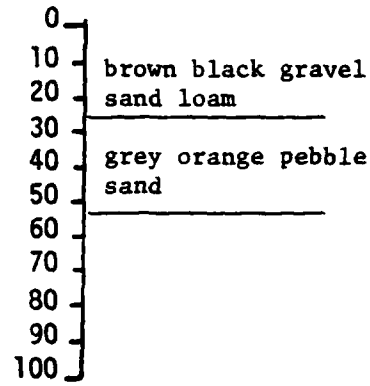

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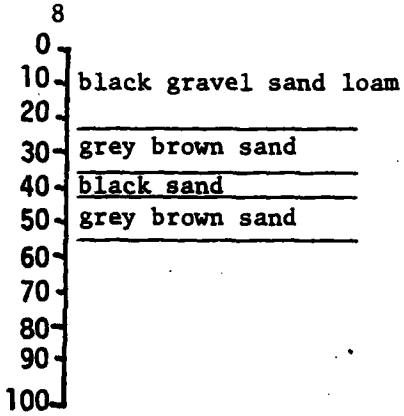

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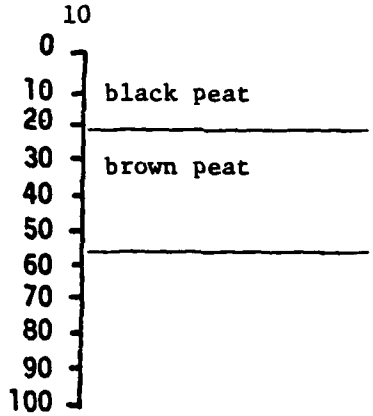

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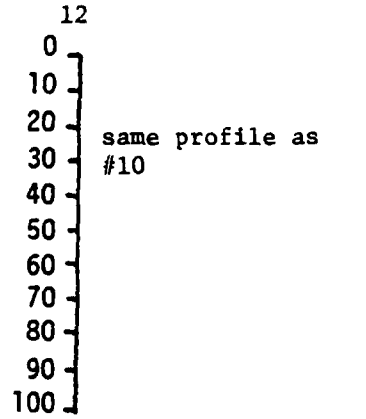

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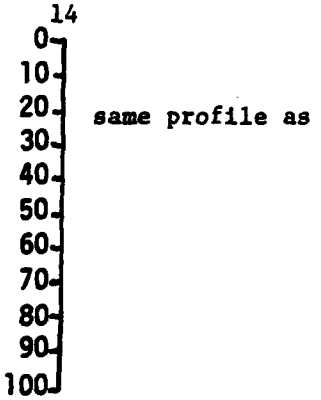

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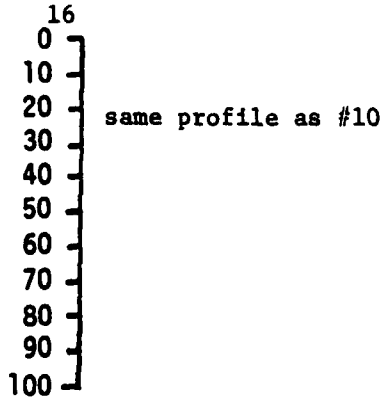

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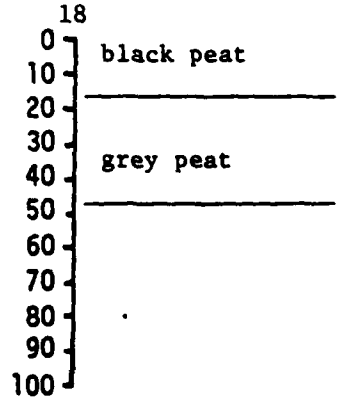


Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

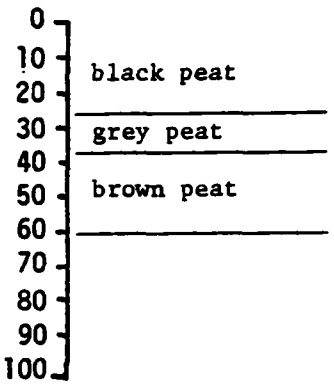
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

20



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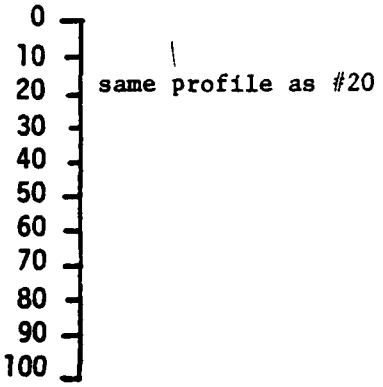

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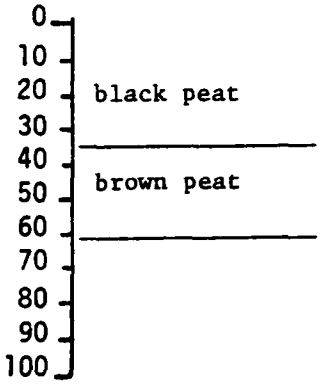

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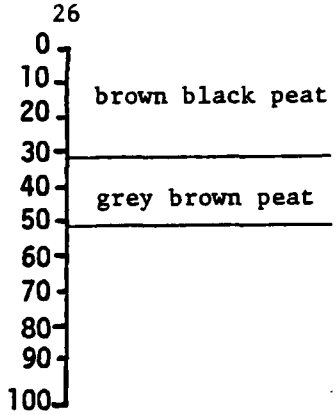

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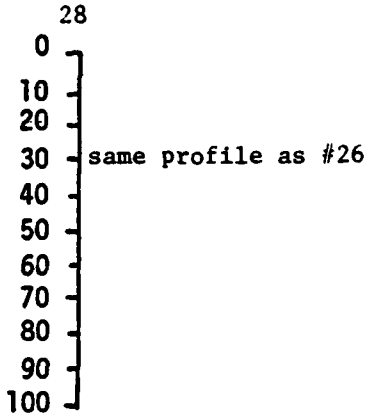

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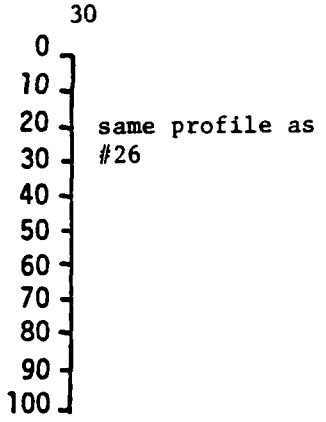

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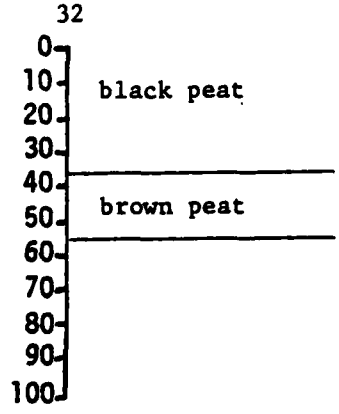

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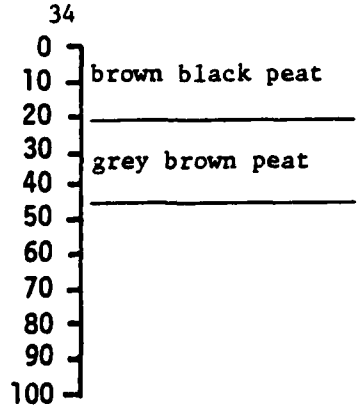

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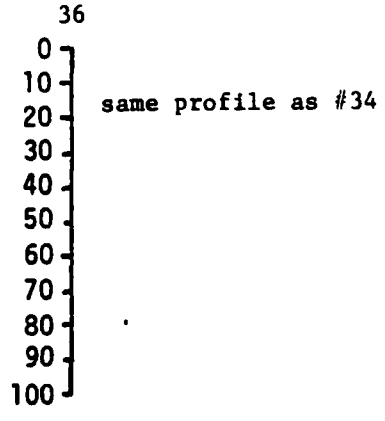

Vertical scale = 1 cm = 20 cm.

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By: _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

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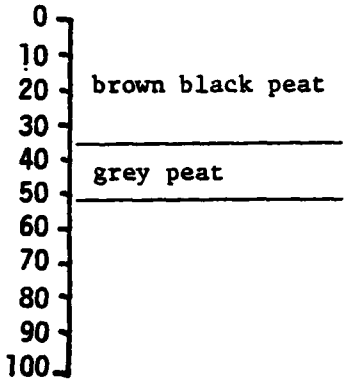

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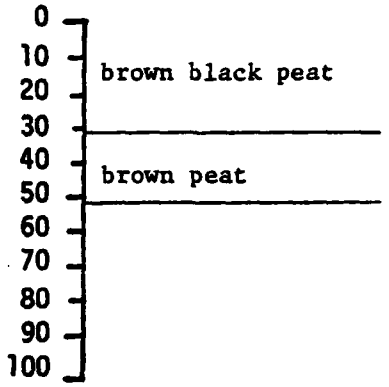

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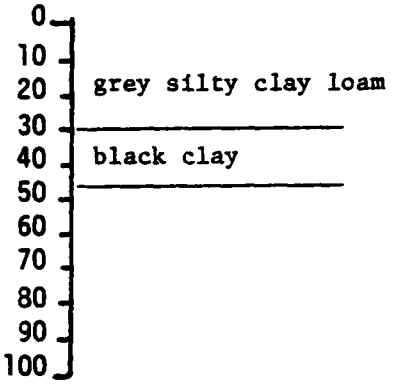

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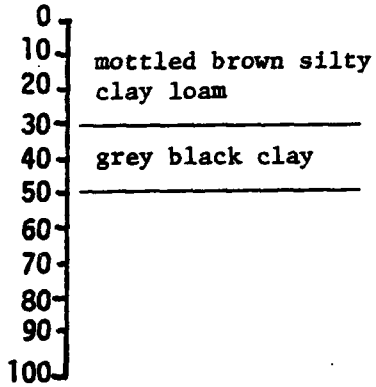

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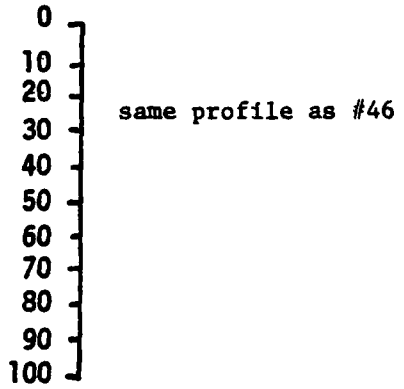

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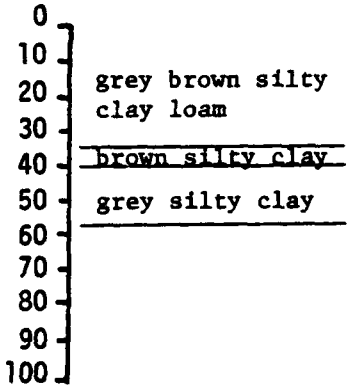

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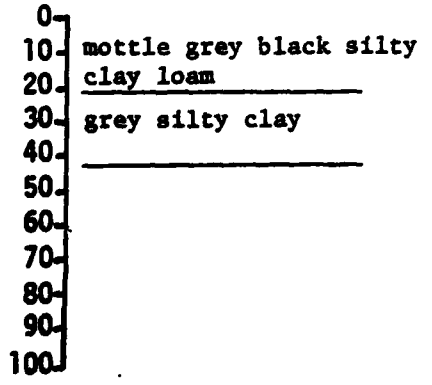

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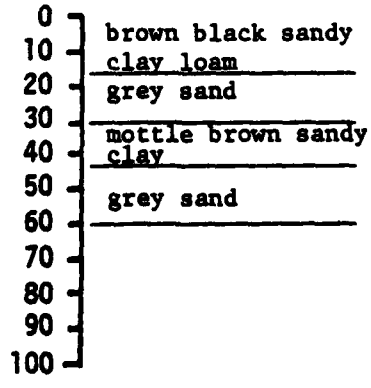

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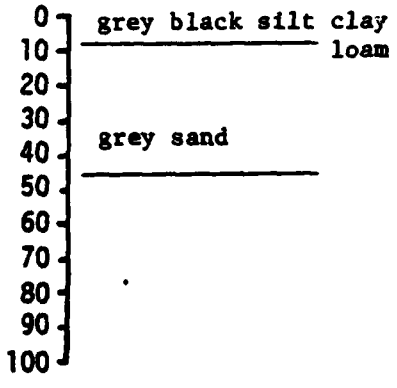


Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

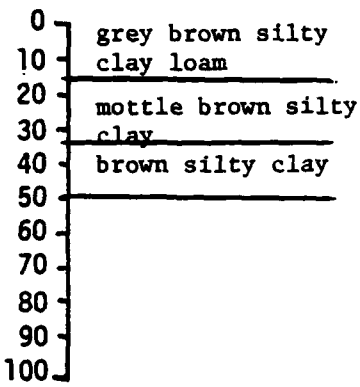
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

56



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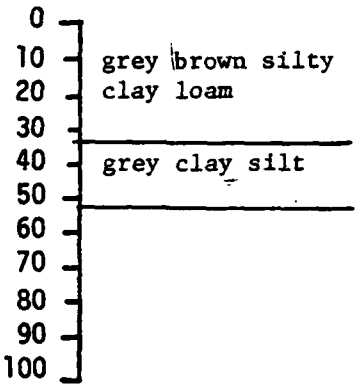

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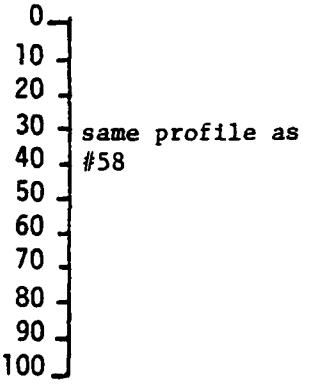

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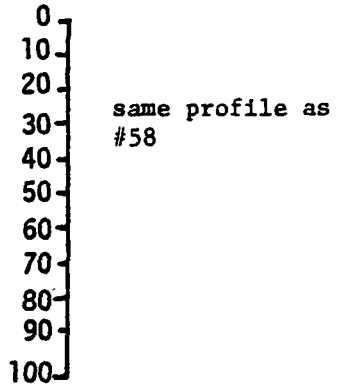

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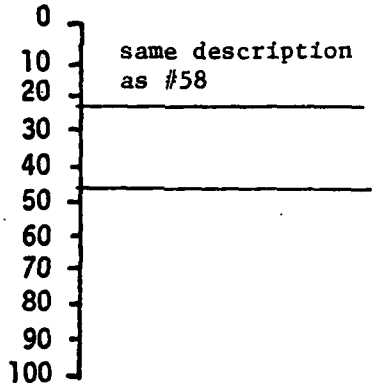

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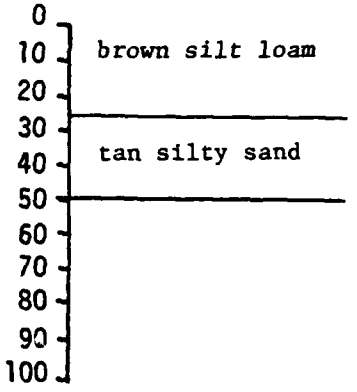

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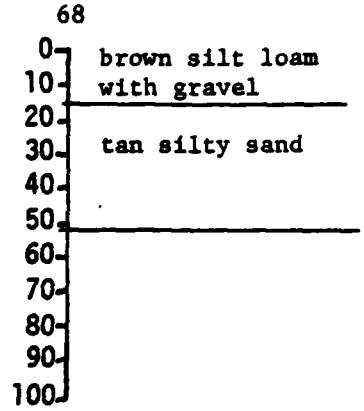

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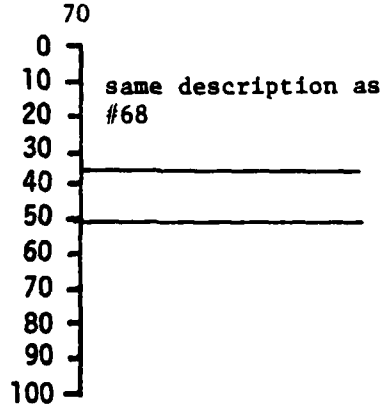

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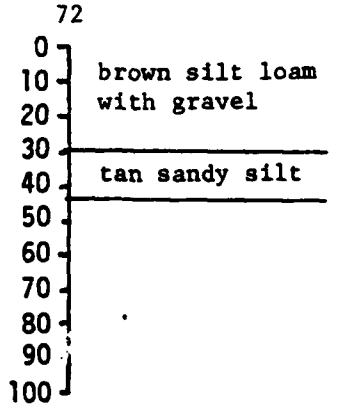


Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

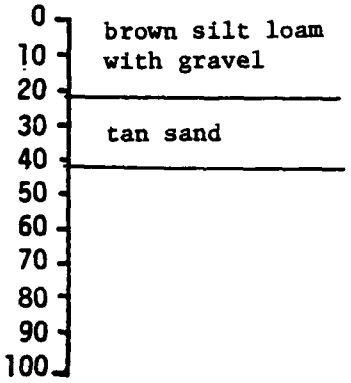
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: Alt. 3

74



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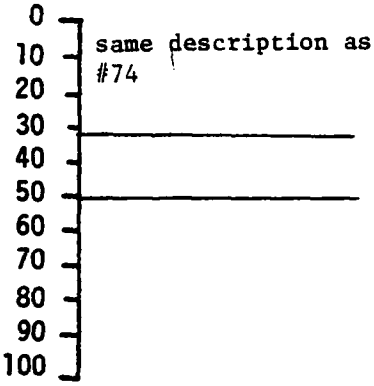

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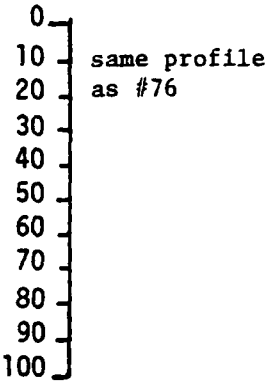

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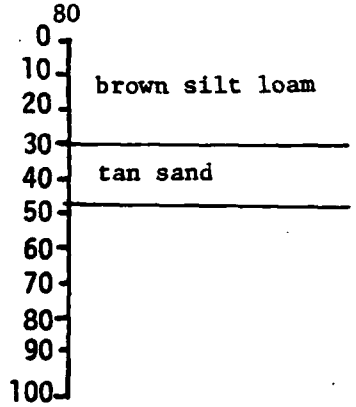

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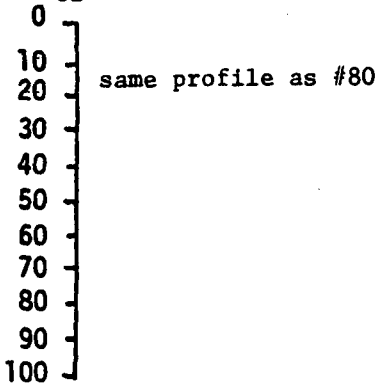

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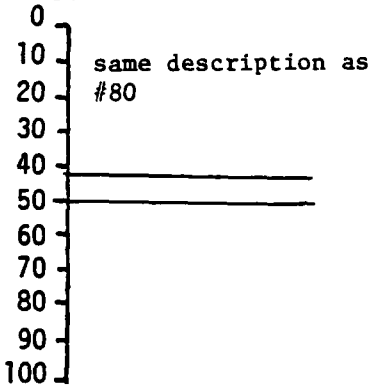

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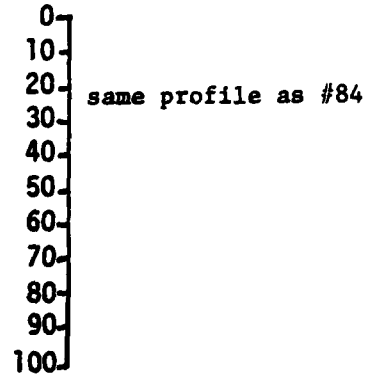

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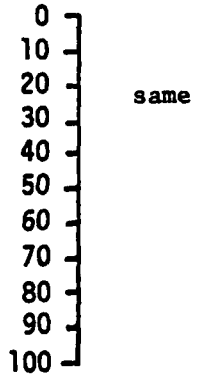

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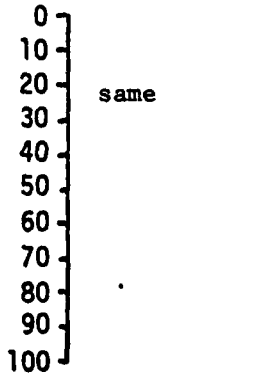


Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

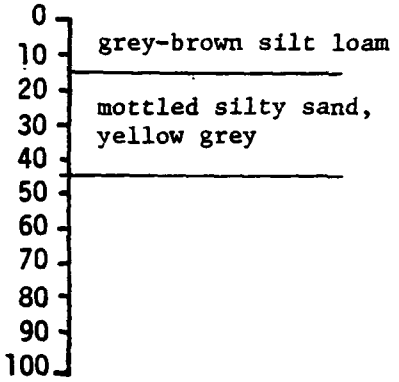
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

1



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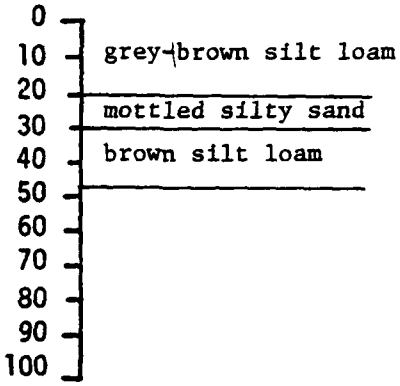

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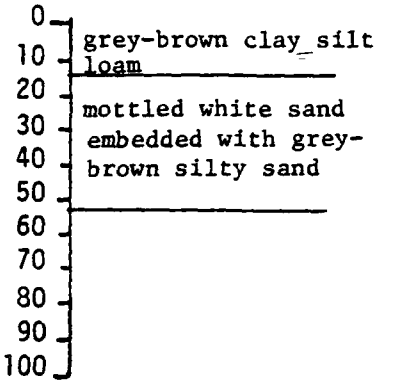

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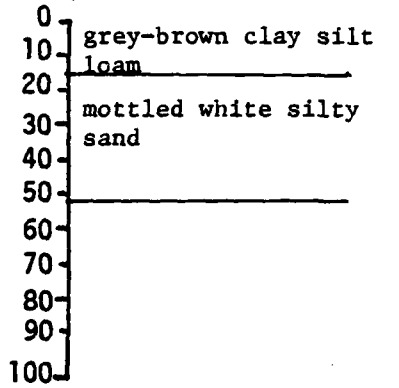

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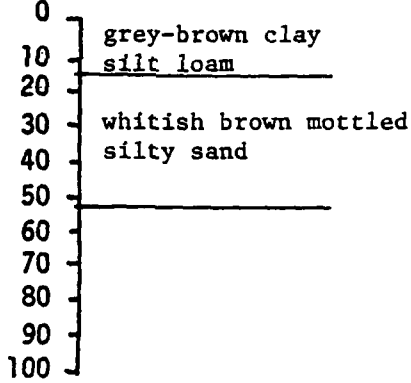

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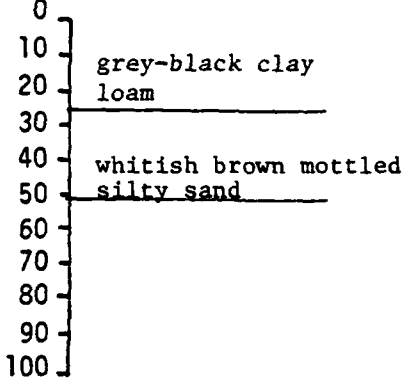

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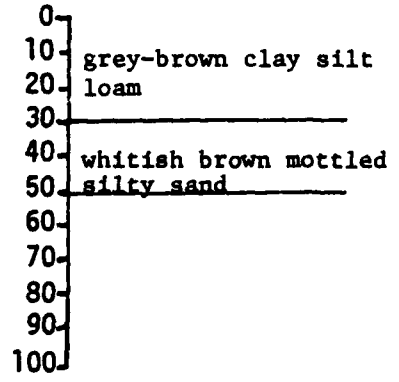

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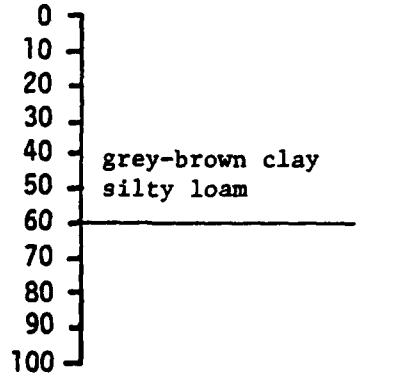

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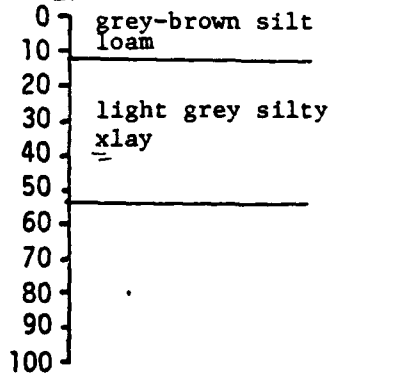


Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

19

same as #17

21

grey-brown silt loam

medium brown silty clay

light brown silty sand

23

grey-black silt loam

medium brown silt loam

25

same profile as #23

27

same profile

29

same profile

31

grey-black silt loam

brown coarse sand

33

grey-black silty clay loam

grey-brown silty clay

35

same profile as #33

Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

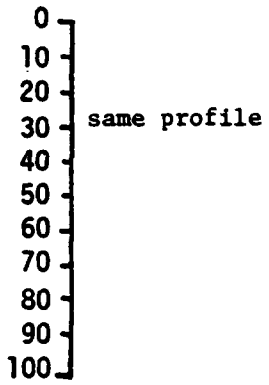
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

37



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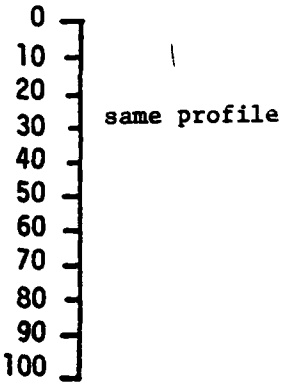

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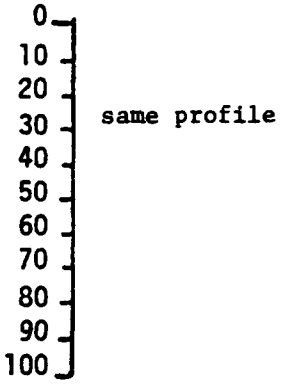

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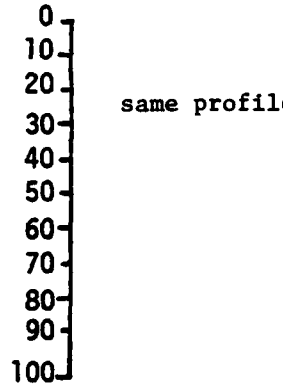

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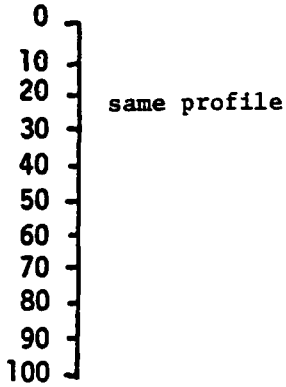

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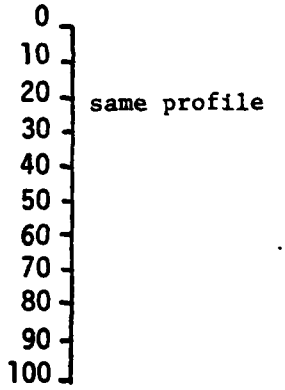

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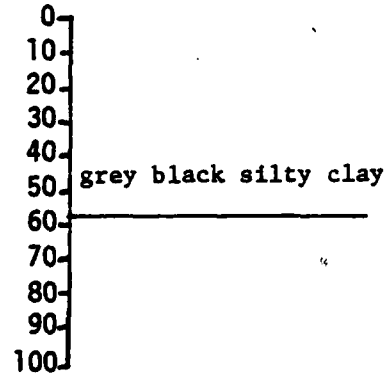

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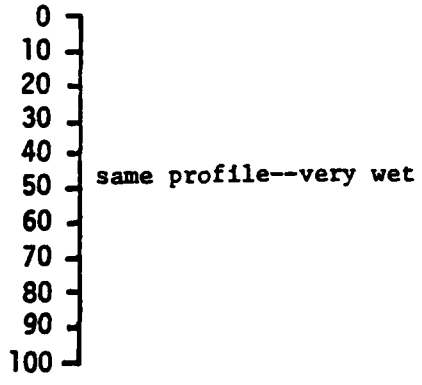
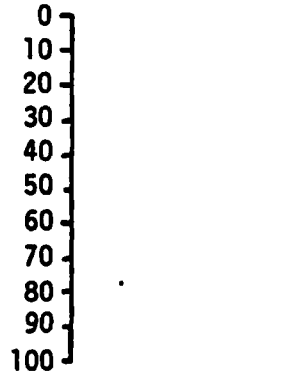




Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

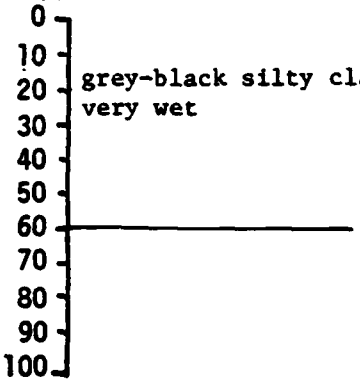
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

53



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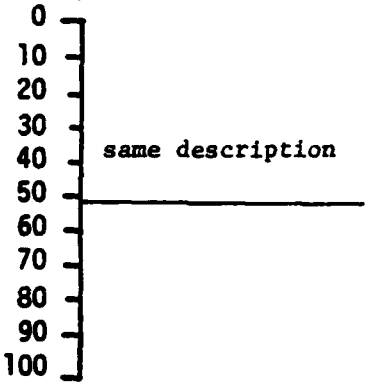

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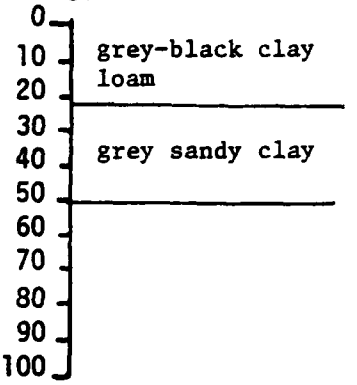

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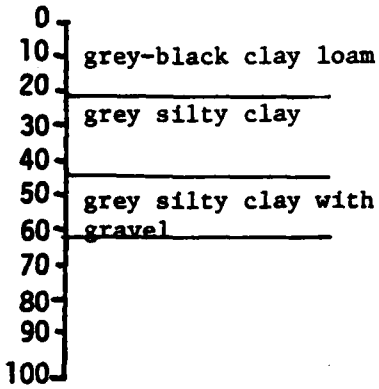

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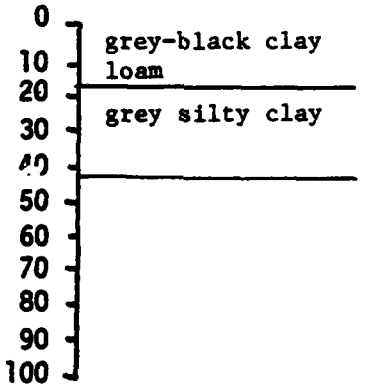

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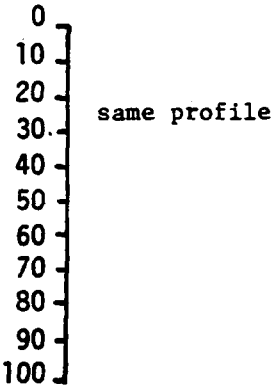

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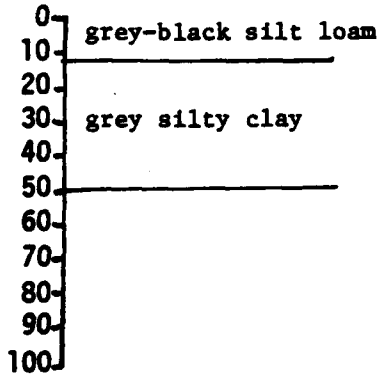

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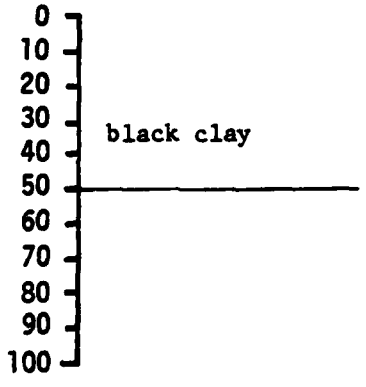

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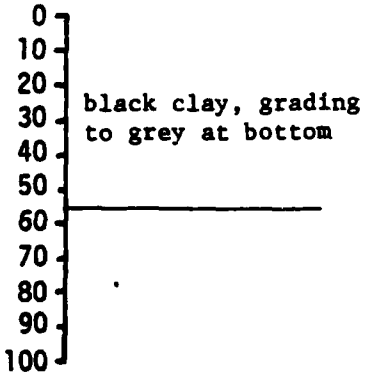
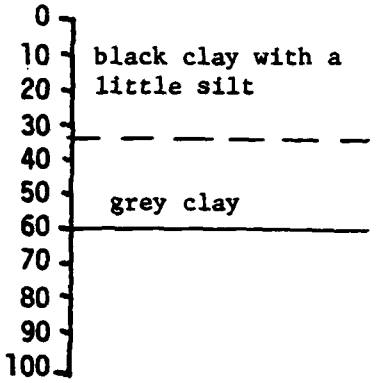


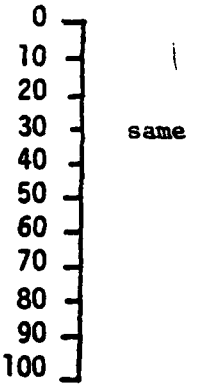
Vertical scale = 1 cm = 20 cm.

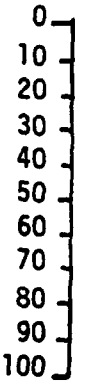
By: _____

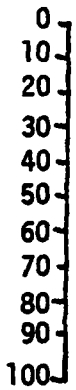
Test unit size = _____

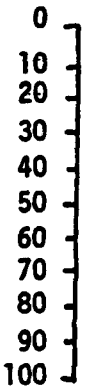
Date: _____

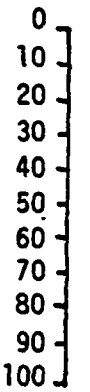


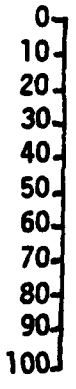


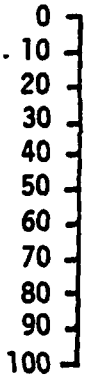


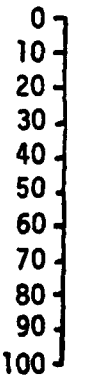












Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

71
0
10 black clay with a
20 little silt
30
\- - - - - - -
40
50 grey clay
60 ____________
70
80
90
100

73
0
10
20
30 same
40
50
60
70
80
90
100

0
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Vertical scale = 1 cm = 20 cm.

Test unit size = ____________

By: ____________

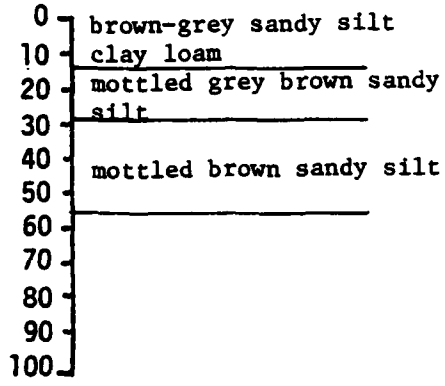
Date: ____________

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

2



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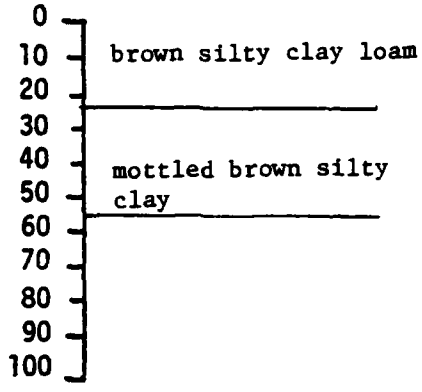

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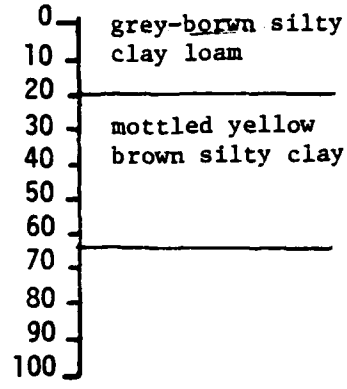

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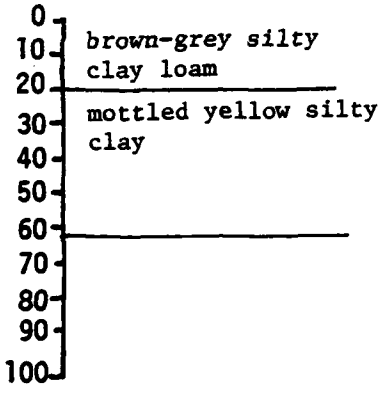

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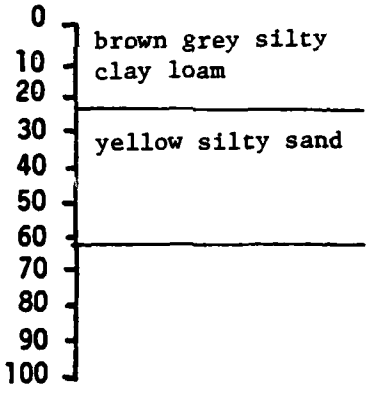

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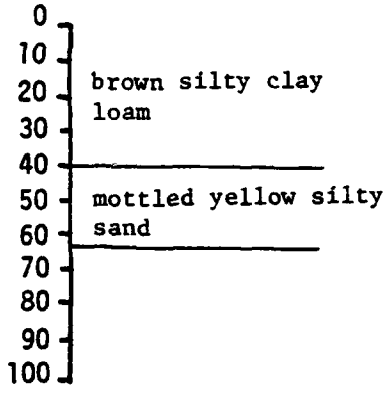

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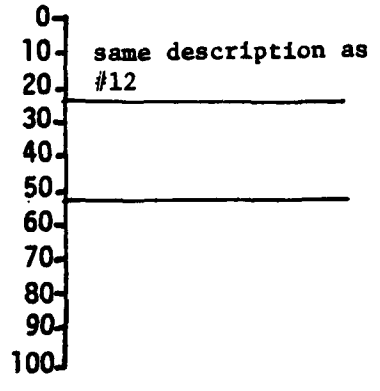

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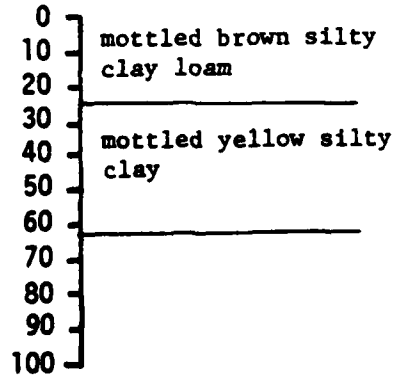

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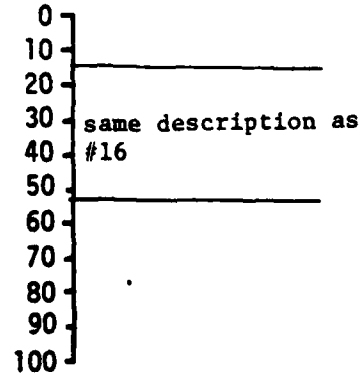


Vertical scale = 1 cm = 20 cm.

Test unit size = _____

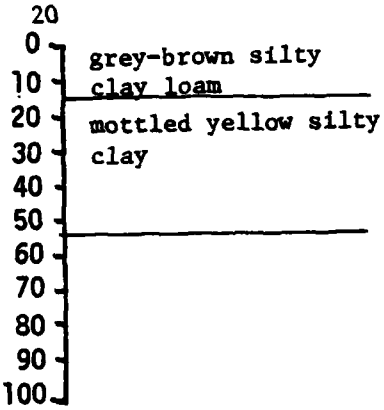
By: _____

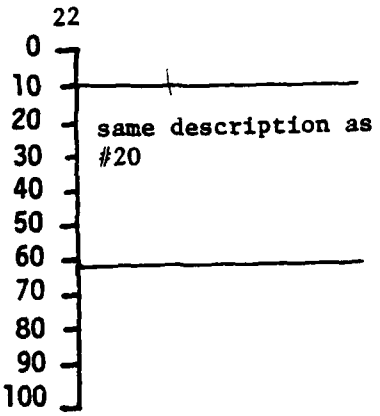
Date: _____

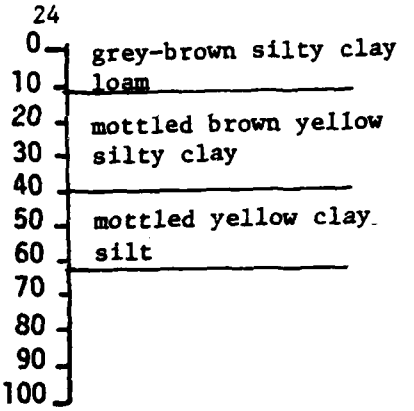
Shovel profile form: University of Minnesota

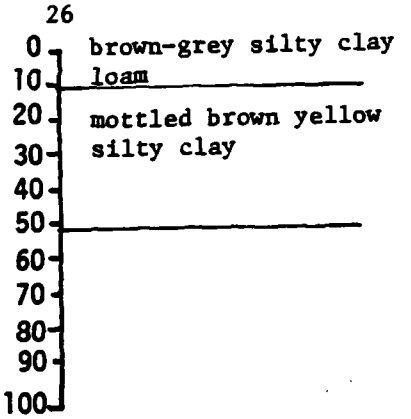
Project: Chaska

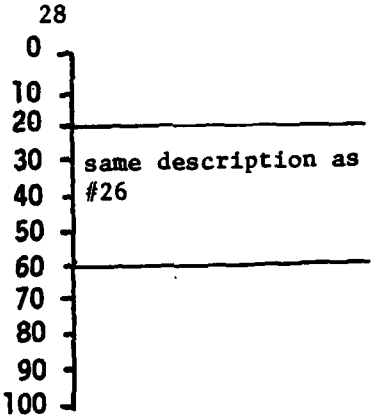
Segment: West Chaska Creek

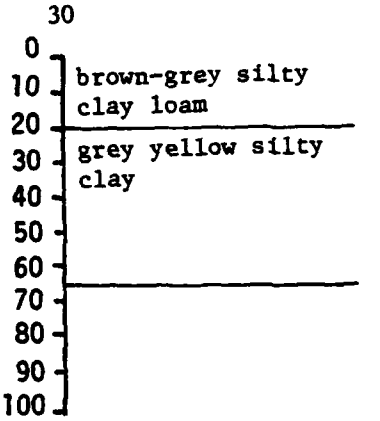


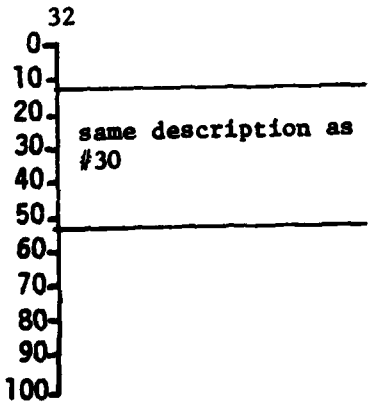


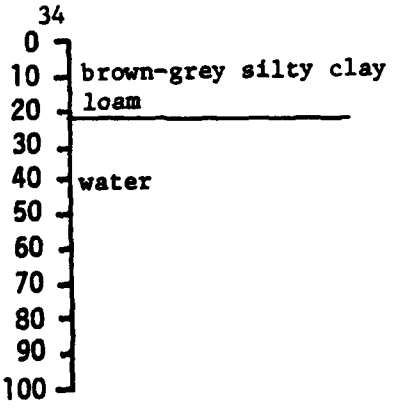


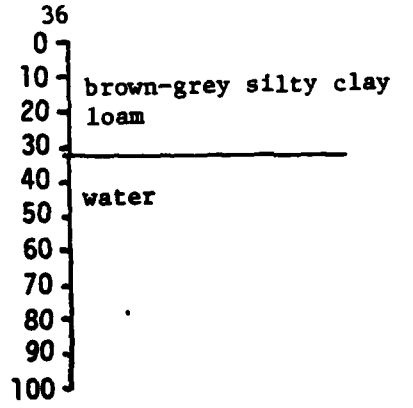












Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

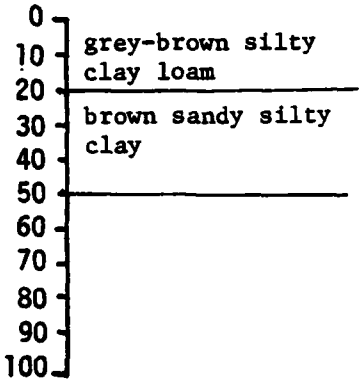
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

38



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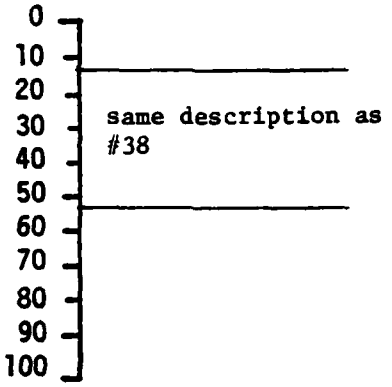

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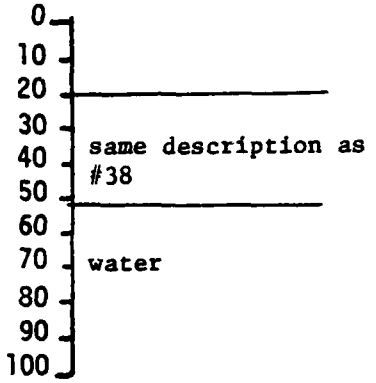

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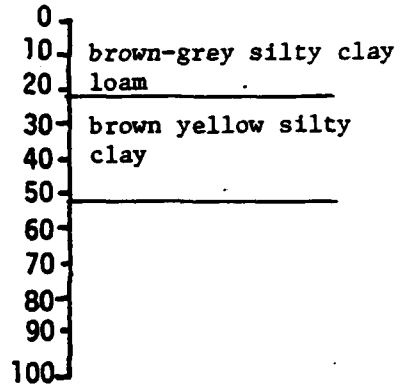

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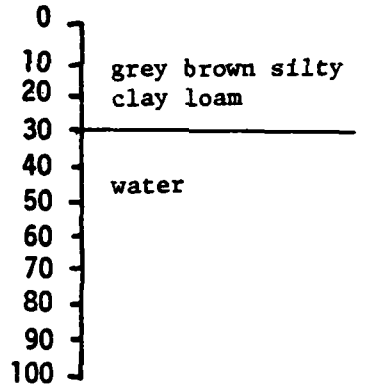

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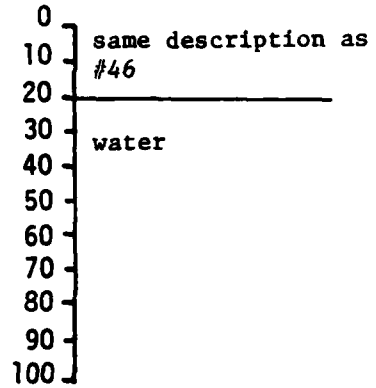

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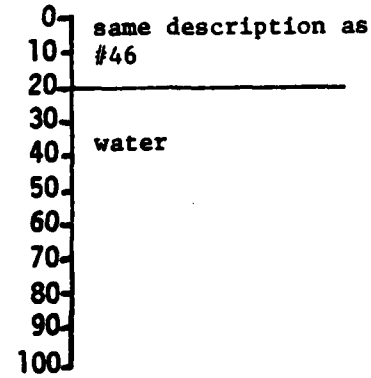

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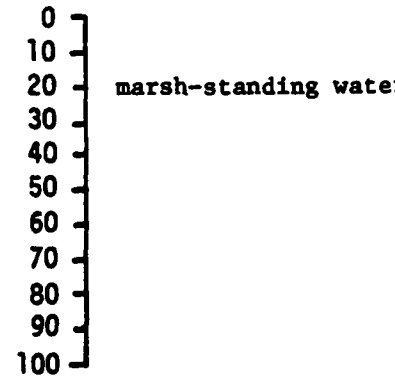
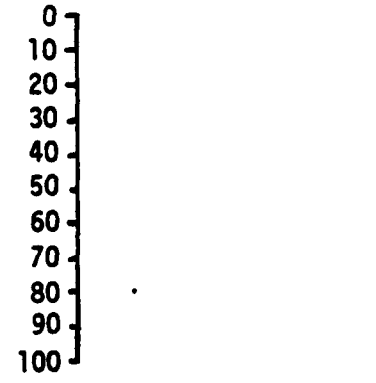




Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

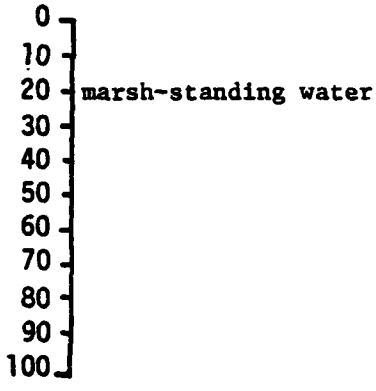
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

54



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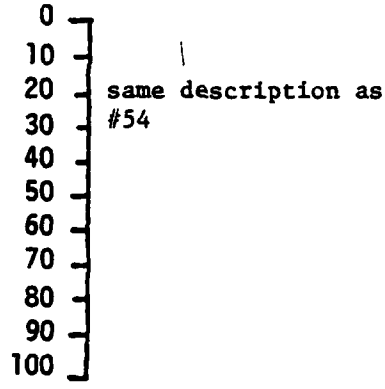

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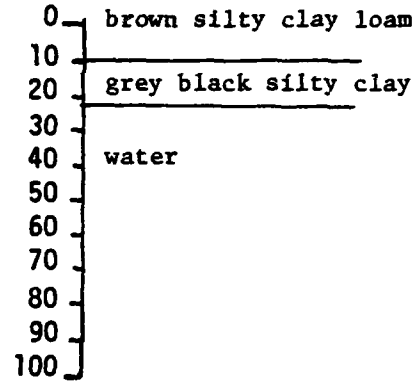

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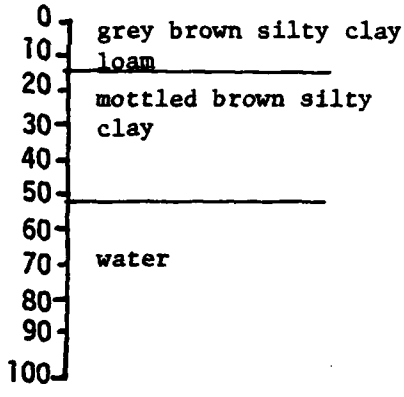

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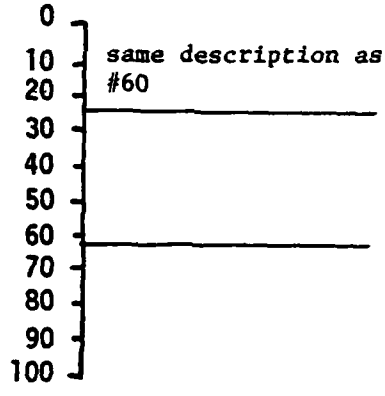

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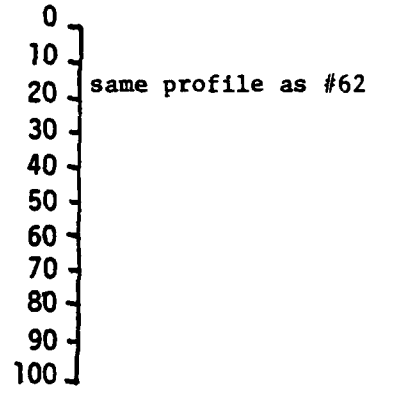

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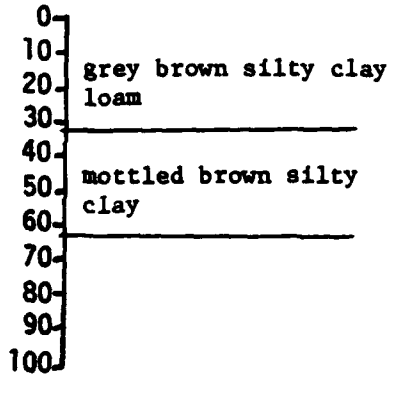

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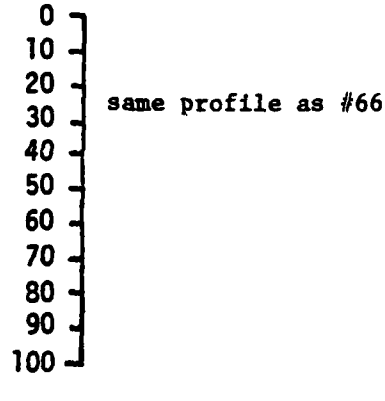

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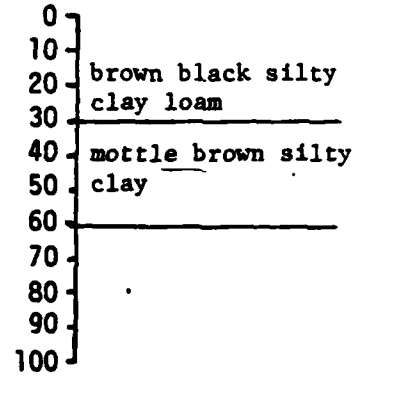


Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

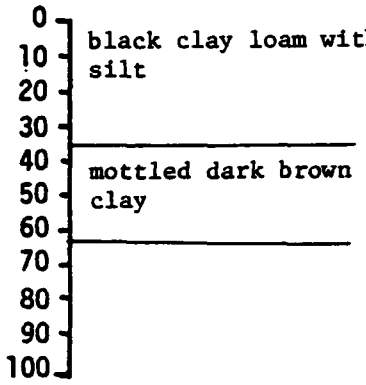
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

72



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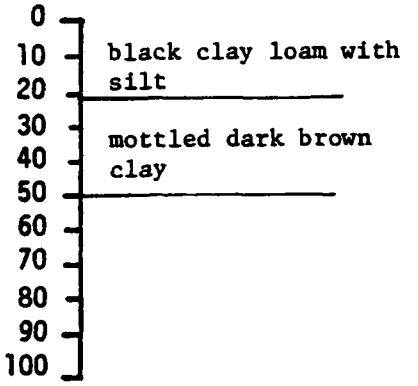
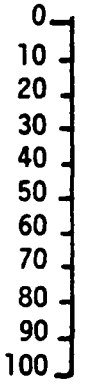
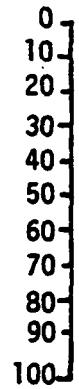
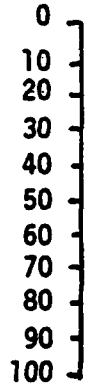
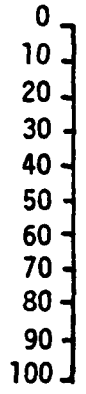
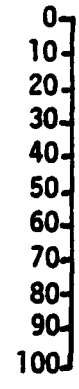


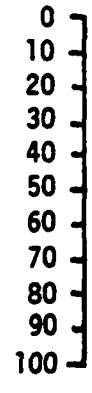


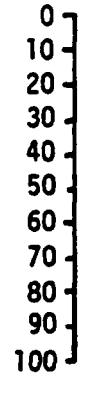












Vertical scale = 1 cm = 20 cm.

Test unit size = ____________

By: ____________

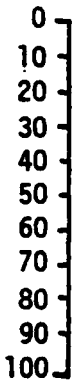
Date: ____________

Shovel profile form: University of Minnesota

Project: Chaska

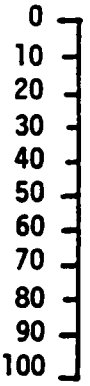
Segment: West Chaska Creek

75



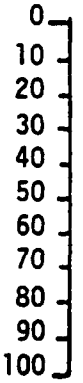
disturbed--Chaska Recycling Center

76



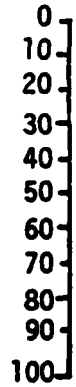
same

77



disturbed--fill

78



same

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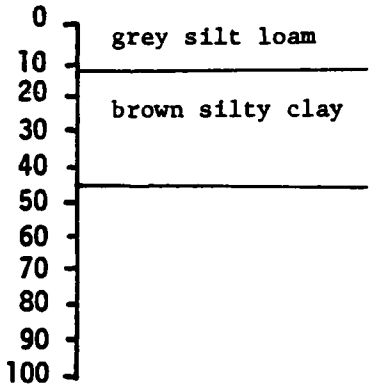

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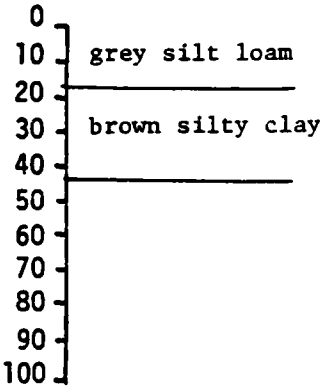

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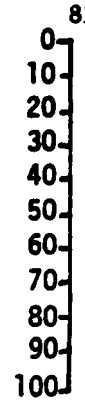

same

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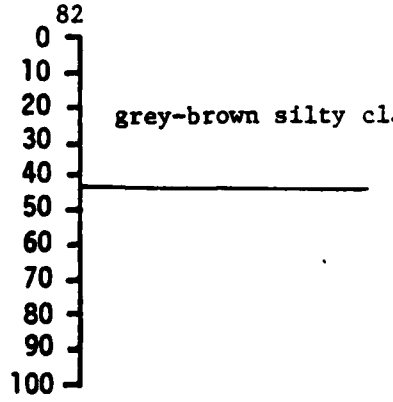

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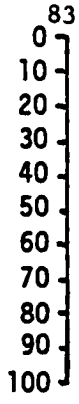


same, with some cinders

Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

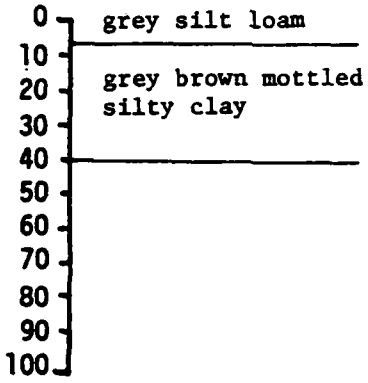
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

84



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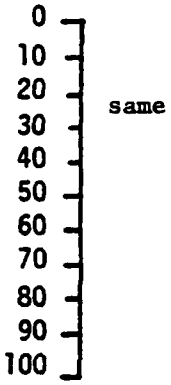

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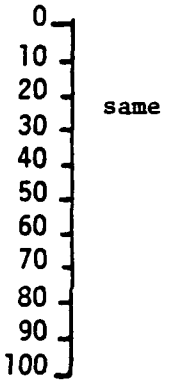

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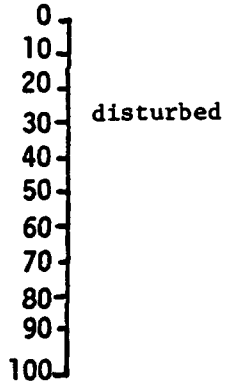

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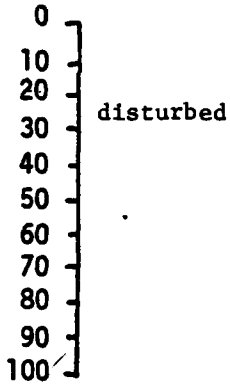

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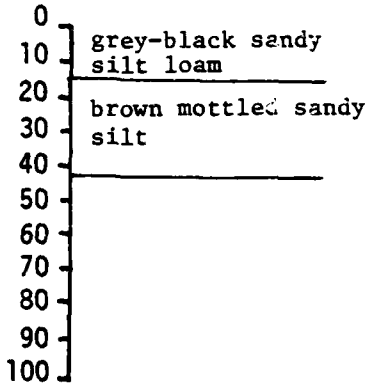

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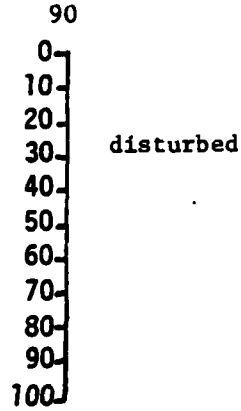

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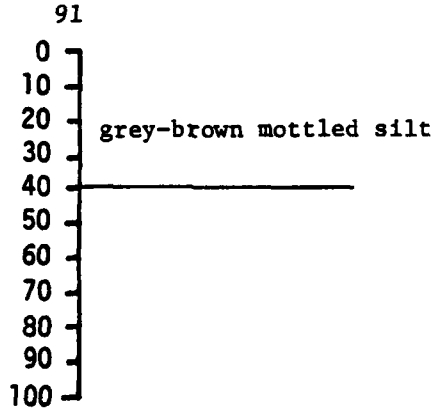

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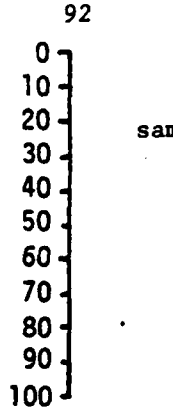


Vertical scale = 1 cm = 20 cm.

By: _____

Test unit size = _____

Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

93

0
10
20
30 disturbed
40
50
60
70
80
90
100

94

0 grey-black silt loam
10
20 grey-brown silty clay
30
40
50
60
70
80
90
100

95

0
10
20
30 same
40
50
60
70
80
90
100

96

0
10
20
30
40 disturbed
50
60
70
80
90
100

97

0
10
20
30
40 disturbed
50
60
70
80
90
100

98

0
10
20
30
40 disturbed--asphalt parking lot, buildings, extensive earth moving of top several feet
50
60
70
80
90
100

99

0
10
20
30
40 same
50
60
70
80
90
100

100

0
10
20
30
40 same
50
60
70
80
90
100

101

0
10
20
30
40 same
50
60
70
80
90
100

Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

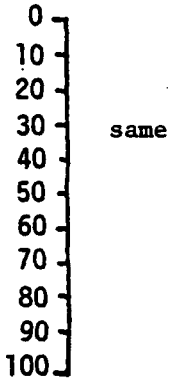
Date: _____

Shovel profile form: University of Minnesota

Project: Chaska

Segment: West Chaska Creek

102



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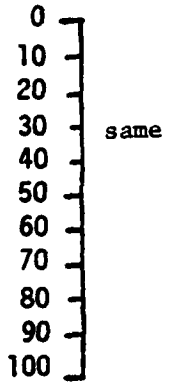

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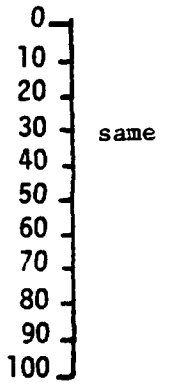

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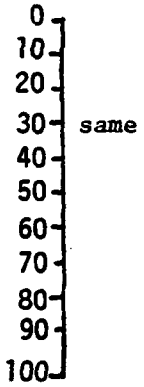

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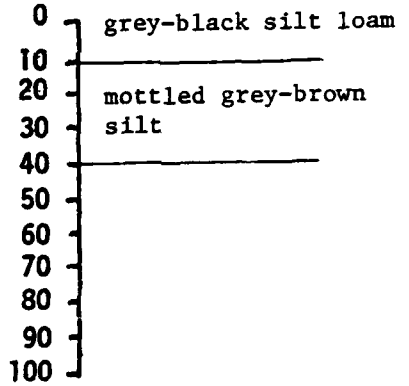

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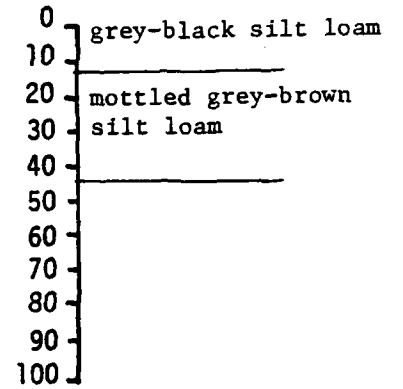

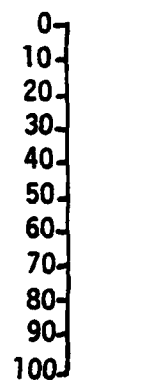

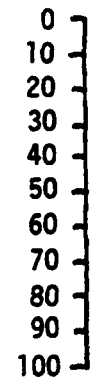

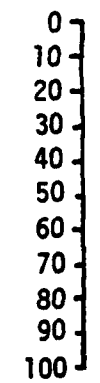

Vertical scale = 1 cm = 20 cm.

Test unit size = _____

By: _____

Date: _____

VITA

Clark A. Dobbs

PII Redacted

[redacted]

Fields of Interest:

Eastern and Middle North America, Mesoamerica; subsistence systems of hunting and gathering groups, and complex societies; cultural ecology; application of symbolic anthropology to complex prehistoric populations; frontiers and "marginal areas" in prehistory.

Education:

B.A.	Anthropology	Indiana University	1973
M.A.	Anthropology	University of Minnesota	1978
	Anthropology	University of Minnesota	

Professional Experience:

1980	Archaeological investigation, Trunk Highway 53, Minnesota.
1980	Archaeological investigation, Center Creek Archaeological District and environs, Minnesota.
1979-1980	Development of attributes of modern fish populations for comparison with prehistoric metrical fish populations. (Directed by Dr. Orrin C. Shane III.)
1979-1980	Archaeological investigation, Chippewa National Forest, Minnesota.
1979	Archaeological investigation, Hiawatha National Forest, Michigan.
1979	University of Minnesota field school - The Vosburg Site, Minnesota. (Assistant field director).
1978	Archaeological investigation, Sanderson Canyon Project, Texas
1977	Archaeological survey, Big Sandy Lake, Aitken County, Minnesota.
1977	Phase I and Phase II - archaeological reconnaissance, and mitigation, Granite Falls Trunk Highway Project; Yellow Medicine County, Minnesota.

1977 Archaeological survey of the Isanti County - Rum River Bridge Project, Isanti County, Minnesota.

1976 Archaeological investigation, Southern Tier Expressway, New York.

1976 Archaeological investigation, Southwest Jefferson Co., Kentucky, Flood Protection Project. (Deep testing of four miles of river frontage and adjacent areas along the Ohio River).

1975 Delaney Creek and Twin-Rush Creek Archaeological Surveys, Washington Co., Indiana; Hall-Flat Archaeological Survey, Dubois Co., Indiana.

1975 Clark Maritime Center Project, Clark County, Indiana. (Deep testing of Ohio River floodplain).

1975 Prairie Creek Site, Indiana. (Escavation of a deeply stratified alluvial site with late Pleistocene associations).

Teaching:

1976-1979 Teaching Assistant, University of Minnesota, Department of Anthropology

1979 Instructor, University of Minnesota, Department of Anthropology

Professional Organizations:

Plains Anthropological Conference
Society for American Archaeology
Society for Field Archaeology
Council for Minnesota Archaeology

Publications and Reports:

1971 A preliminary analysis of glass trade beads from the Ouiatenon Site (12-T-9). Directed by Dr. James H. Kellar, Glenn A. Black Laboratory of Archaeology, Indiana University.

1972 Trade beads at Ouiatenon revisited: New data, new perspectives. Ms on file at Tippecanoe County Historical Association, Lafayette, Indiana.

1973 Remember man as you pass by: Grave art from Warren and Fountain Counties, Indiana. Directed by Dr. Warren Roberts, Indiana University.

1975a Prehistoric and historic cultural resources of the Delaney Creek Area, Washington County, Indiana. USDA Soil Conservation Service and Glenn A. Black Laboratory of Archaeology.

1975b (With Randall L. Guendling). Prehistoric and historic cultural resources of the Twin-Rush Creek Area, Washington County, Indiana. USDA Soil Conservation Service and Glenn A. Black Laboratory of Archaeology.

1976 Prehistoric cultural resources of the Southwest Jefferson Co., Kentucky, Local Flood Protection Project. U. S. Army Corps of Engineers.

1977 A preliminary assesment of the prehistoric cultural resources within the Southern Tier Expressway Project, New York. New York State Department of Transportation.

1980 In preparation with the Minnesota Archaeological Society. Archaic subsistence in southwestern Minnesota: The view from Granite Falls.

ABBREVIATED RESUME

PII Redacted

Elden Johnson
Professor of Anthropology
Department of Anthropology
University of Minnesota
215 Ford Hall
224 Church St. S.E.
Minneapolis, Minnesota 55455
(612) 373-0221

[redacted]

Professional employment and offices:

1953-55 Curator of Anthropology, Science Museum, St. Paul, Minnesota
1955-58 Assistant Professor of Anthropology, University of Minnesota
1958-59 Director of Science Museum and Assistant Professor, University of Minnesota
1959-65 Associate Professor, University of Minnesota
1965-to date Professor of Anthropology, University of Minnesota
1963-78 State Archaeologist, Minnesota
1972-75 Chairperson, Department of Anthropology, University of Minnesota
1977- Chairperson, Department of Anthropology, University of Minnesota

Education:

1940-41 University of New Mexico
1945-48 University of Minnesota
1948-50 University of Minnesota
1950-53 Yale University

Field Research:

1949 Standing Rock Reservation, North Dakota, ethnology
1952-53 Thailand/Cambodia, ethnology
1953-56 Spring Lake, Minnesota, archaeology and ethnohistory
1959-76 Minnesota, North Dakota, annual archaeological research
1967 Paleolithic site survey, Pakistan

Professional Associations:

American Anthropological Association, Fellow
Society for American Archaeology
American Association for the Advancement of Science
Sigma Xi
Council for Minnesota Archaeology

Fellowship and awards:

1950-52 Yale University Graduate Fellow
1952-53 Ford Foundation Foreign Area Training Fellow
1960-61 National Science Foundation Research Grant
1966-67 Hill Family Foundation Research Grant
1967 University of Minnesota Graduate School Research Grant

Cultural Resources Contracts:

1975	Leech Lake, Federal Dam Survey. St. Paul District, Corps of Engineers
1976-77	Lake Winnibigoshish Reservoir Survey, St. Paul District, Corps of Engineers
1977-78	Lake Winnibigoshish Dam Site mitigation, Crops of Engineers, St. Paul District
1978-79	Headwaters Reservoirs Survey, Crops of Engineers. St. Paul District.

LIST OF PUBLICATIONS

Elden Johnson
University of Minnesota

1954 Review: Walam Olum or Red Score: The Migration Legend of the Lenni Lenape or Delaware Indians, Indiana Historical Society. Minnesota History, Vol. 34, No. 4, p. 160.

1955 "Carl Bodmer Paints the Indian Frontier." Indian Leaflets, No's. 8, 9, 10. The Science Museum, St. Paul.

"A Human Effigy Pipe from North Dakota." Plains Anthropologist, No. 5, p. 11, December 1955.

"Indian Houses." Gopher Historian, Vol. 10, No. 5, pp. 16-17.

Review: The Micmac Indians of Eastern Canada, by Wilson D. and Ruth Wallis. Minnesota History, Vol. 34, No. 6, p. 257.

1956 "Spring Lake Archaeology: The Lee Mill Cave," (with Philip S. Taylor). Science Bulletin, No. 3, Pt. 2. Science Museum, St. Paul.

Review: The Atlatl in North America, by James H. Kellar. American Antiquity, Vol. 22, No. 1, p. 86.

1957 "The Minnesota Archaeological Site File." Minnesota Archaeologist, Vol. 21, No. 2, pp. 14-16.

"Indians before History in the Upper Mississippi Valley," (and Louis H. Powell). Guide Pamphlet, No. 3. Science Museum, St. Paul.

"Hopewell Burial Mounds in St. Paul." Park Leaflets, No. 3. Science Museum, St. Paul.

Review: The Indian Tipi, by Reginald and Gladys Laubin (University of Oklahoma Press, 1957). Minnesota History, December, pp. 376-377.

1958 Annual Report of the Director. Science Museum, St. Paul.

1959 "Spring Lake Archaeology: The Sorg Site." Science Bulletin, No. 3, Pt. 3. Science Museum, St. Paul.

"An Archaic Horizon Cache from Southern Minnesota." Proceedings, Vol. 27. Minnesota Academy of Science, pp. 3-5.

Review: Araucanian Child Life and Its Cultural Background. Smithsonian Miscellaneous Collections, Vol. 133. By Sister M. Inez Hilger, 1957. American Anthropologist, Vol. 61, No. 3, p. 530.

Review: New Light on Old Fort Snelling, by John Callender. Minnesota Historical Society. Minnesota History, June, p. 230.

1960 "Cambria Burial Mounds in Big Stone County." Minnesota Archaeologist, Vol. 23, No. 3, pp. 53-81.

"Glacial Lake Agassiz and Prehistoric Man." Minnesota Archaeological Newsletter, No. 1, pp. 4-7, March 1960.

"A Statistical Analysis of Some Mississippian Projectile Points," (with Craig Henrikson). Proceedings, Vol. 28, pp. 89-92. Minnesota Academy of Science.

Atlas for Anthropology, (with Robert F. Spencer). W. C. Brown, Dubuque.

Review: Hidden America, by Roland Wells Robbins. Minnesota History, Vol. 37, No. 1, pp. 30-31.

Review: Indian Life in the Upper Great Lakes, 11,000 B.C. to A.D. 1800, by George I. Quimby, 1960. Minnesota History, Vol. 37, No. 4, p. 174, December 1960.

1961 Review: Indian Life in the Upper Great Lakes, 11,000 B.C. to A.D. 1800, by George I. Quimby. American Antiquity, Vol. 27, No. 2, p. 250.

1962 "An Archaic Burial Site in Minnesota." Minnesota Archaeologist, Vol. 14, No. 4, pp. 92-101.

"Notes on the Mdewakanton Bark House." Minnesota Archaeologist, Vol. 14, No. 2, pp. 49-52.

Manual for Introductory Anthropology, (with Evelyn Hatcher). Burgess Publishing Co., Minneapolis.

"The Prehistory of the Red River Valley." Minnesota History, Vol. 38, No. 4, pp. 157-165.

Review: Indian Rock Paintings, by S. Dewdney and K. Kidd (University of Toronto Press). Minnesota History, Vol. 38, No. 2, p. 87.

1963 "The Prehistory of the Red River Valley." Minnesota Archaeologist, Vol. 25, No. 4, pp. 146-155 (Reprint of 1963 article in Minnesota History).

1964 "Copper Artifacts and Glacial Lake Agassiz Beaches." Minnesota Archaeologist, Vol. 26, No. 1, pp. 4-21.

"Twenty New Radiocarbon Dates from Minnesota." Minnesota Archaeologist, Vol. 26, No. 2, pp. 35-49.

"Sandy Lake Ware and its Distribution," (with Leland R. Cooper). American Antiquity, Vol. 29, No. 4, pp. 474-479.

"Introduction," in J. D. Holmquist and A. H. Hillman, eds, Diving into the Past, p. 19. Minnesota Historical Society, St. Paul.

1965 "Tribes of the Northeast." In R. F. Spencer and J. D. Jennings, eds., The Native Americans, pp. 384-401. Harper and Row, New York.

"Tribes of the Great Plains." In R. F. Spencer and J. D. Jennings, eds., The Native Americans, pp. 337-384. Harper and Row, New York.

"MORRC and Archaeology." Minnesota Archaeological Newsletter, No. 7.

1966 "An Archaeology Program for Minnesota." Minnesota Outdoor Recreation and Resources Commission Report No. 5. St. Paul.

Manual for Introductory Anthropology, (with Evelyn Hatcher). (Revised and reissued.) Burgess Publishing Co., Minneapolis.

1967 "An Unusual Copper Knife." Minnesota Archaeologist, Vol. XXIV, No. 4, pp. 104-105.

"Prehistory in our State Parks." Conservation Volunteer, Vol. 30, No. 173, pp. 13-17.

"An Unusual Burial from Grant County." Minnesota Archaeologist, Vol. 29, No. 2, pp. 48-51.

1968 Atlas for Anthropology, (with Robert F. Spencer). (Revised Edition.) W. C. Brown, Dubuque.

1969 "Decorative Motifs on Great Oasis Pottery." Plains Anthropologist, Vol. 14, No. 46, pp. 272-276.

"Burial Mounds of Central Minnesota," (with Lloyd A. Wilford and Joan Vicinus). Minnesota Prehistoric Archaeology Series, No. 1. Minnesota Historical Society, St. Paul.

"Archaeological Evidence for the Utilization of Wild Rice." Science, 163, pp. 276-277.

"Preliminary Notes on the Prehistoric Use of Wild Rice." Minnesota Archaeologist, Vol. 30, No. 2, pp. 31-43.

"The Birch Lake Mound Group," (with M. Q. Peterson and Jan Streiff). Journal of the Minnesota Academy of Science, 36:1, pp. 3-8.

Review: The Hitchell Site, by Richard Johnston. Plains Anthropologist, pp. 166-167.

"The Prehistoric Peoples of Minnesota." Minnesota Prehistoric Archaeology Series, No. 4. Minnesota Historical Society, St. Paul.

1970 "Prehistoric Archaeology and Public Interpretation." Minnesota History, Vol. 42, No. 4, pp. 153-154.

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1973 "Professional Responsibility and the American Indian." American Antiquity, Vol. 38, No. 2, pp. 129-130.

"Interesting Archaeological Reading." Minnesota Archaeologist, Vol. 32, No's. 1 and 2, pp. 113-114.

"Notes on a Paleolithic Site Survey in Pakistan." Asian Perspectives, Vol. 15, pp. 60-65.

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1974 Editor, Upper Great Lakes Anthropology: Essays in Honor of Lloyd A. Wilford. Minnesota Prehistoric Archaeology Series, No. 11. Minnesota Historical Society, St. Paul.

"Lloyd A. Wilford and Minnesota Archaeology." In E. Johnson, Editor, Upper Great Lakes Anthropology: Essays in Honor of Lloyd A. Wilford. Minnesota Prehistoric Archaeology Series, No. 11, pp. 1-8. Minnesota Historical Society, St. Paul.

1975 "An Early Woodland Pottery Vessel from Minnesota." Scientific Publications, New Series, Vol. 2, No. 4. Science Museum of Minnesota (G. J. Hudak, co-author).

1977 "Tribes of the Northeast." In R. F. Spencer and J. D. Jennings, eds., The Native Americans, 2nd edition, revised, Harper and Row, New York.

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Cultural Resource Inventory of Lands Adjacent to Lake Winnibigoshish. Archaeology Laboratory, University of Minnesota 135 pp., 6 figs., 22 maps, 46 plates. Minneapolis.

1978 "Cultural Resource Investigation at the Lake Winnibigoshish Dam Site - 21IC4." 67 pp., 14 plates, 11 figs., 6 tables. Archaeology Laboratory Report, Contract DACW37-77-C-0139, St. Paul District, Corps of Engineers.

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"Cultural Resource Investigation of the Reservoir Shorelines: Gull Lake, Leech Lake, Pine River and Lake Pokegema." 3 vols., Archaeology Laboratory Report. Contract DACW37-80-C-0064, St. Paul District, Corps of Engineers.

CURRICULUM VITAE

Robert C. Vogel
Department of Geography
University of Minnesota

PII Redacted

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EXPERIENCE

Archaeologist, Archaeological Services, Laramie, Wyo. Survey and mitigation in southern Wyoming under contract to Amoco Production Company and other energy corporations. Served on ABC Project, an excavation of a very large tipi ring site near Bairoil (48W2369), Sweetwater County. June-July, 1980.

Historical Archaeologist, Archaeological Surveys, Illinois State University, Normal. Directed literature search and archival investigations in southeastern Missouri for U. S. Army Corps of Engineers (St. Louis District) Pine Ford Lake Project. March-April, 1980.

Researcher/Consultant, self-employed. Carried out literature searches, ethnographic overviews, standing structure documentation studies, et cetera, in the field of cultural resource management and historic preservation. Work contracted through various government agencies, public institutions and private firms in Minnesota, Louisiana and Texas. June, 1978-present.

Graduate Teaching Assistant, Department of Geography, University of Minnesota, Minneapolis. Historical, physical and urban geography survey courses under professor Barrett and Sheppard. 1977-78.

Managing Editor, The Life and Times of Jean Laffite. Edited and published this series of occasional papers, the bulletin of the Laffite Study Group, a non-profit educational organization. 1975-present.

EDUCATION

Graduate School, University of Minnesota, Minneapolis. Major in geography; history minor. 1976-present.

Graduate School, Northwestern State University of Louisiana, Natchitoches. Summer field school in archaeology. 1978.

College of Liberal Arts, University of Minnesota, Minneapolis. Bachelor of Arts in geography; strong background in history and geology. 1970-75.

PUBLICATIONS AND PAPERS

1976 The Bayou Pierre Settlements. North Louisiana Historical Association Journal 7:101-111.

n.d. Cultural Geography of Eighteenth Century Settlements in the Dolet Hills, Louisiana. Paper presented at the 19th Caddo Conference, Natchitoches, La., on 26 March, 1977.

n.d. Native American Slavery in Frontier Trade and Diplomacy. Paper presented at the Monday Club, a cross-disciplinary symposium in New World history and culture sponsored by the Department of History, University of Minnesota, Minneapolis, on 8 May, 1978.

n.d. Historic Yatasi Settlement Patterns. Paper presented at the 21st 21st Caddo Conference, Arkadelphia, Ark., on 29 March, 1979.

1980 An Archaeological Reconnaissance of the Minneapolis Campus, University of Minnesota. The Minnesota Archaeologist 39:106-110.

n.d. The French Presence in Minnesota: A Selective Bibliographic Guide for Archaeologists. In preparation; to be published in University of Minnesota, Publications in Anthropology.

CURRENT RESEARCH INTERESTS

Historical geography of North America; the French presence in the Mississippi River Valley; Santee Dankota ethnohistory; colonial land grants and surveys; the archaeology of the Spanish Borderlands and New France; cultural resource management.

Resume/1981

PII Redacted

William J. Yourd

[redacted]

Current Address Center for Ancient Studies
310 Folwell Hall
University of Minnesota
Minneapolis, Minnesota 55455

Education

A.B. Grinnell College, 1975. Major: Anthropology.
Bemidji State University, 1977-78. Graduate study.
University of Minnesota, 1979-. Center for Ancient Studies, Master's program.

Archaeological Fieldwork

1980 - U.S. Forest Service. Superior National Forest
1979 - (MN). Seasonal cultural resource surveys.

1978 - U.S. Forest Service. Chippewa National Forest (MN). Seasonal cultural resource surveys.

1977 - Bemidji State University, Archaeological Field School, Preece Site. Assistant Field Director.

1976 - Bemidji State University. Roseau River Project, Lins Site. Assistant Field Director.

1975 - Texas Technological University. Lubbock Lake Site. Crew Chief.

1974 - Texas Technological University. Lubbock Lake Site. Field assistant.

1973 - Bemidji State University. Mississippi Headwaters Reservoir Project. Field assistant.

- Bemidji State University. Archeological Field School, Preece Site. Student excavator.

1976-present. Assisted in about 30 minor archaeological impact studies undertaken for various public and private agencies.

Laboratory Experience

Pollen and plant macrofossil analyses. University of Minnesota, Pollen Laboratory. Bemidji State University, Department of Geology.

Printed Reports

1977. (With A.P. Brew). Intensive Archaeological Testing of the Lins Site. Bemidji State University.

- (With A.P. Brew). Cultural Resources Survey of the Small Boat Harbor Project at Lake of the Woods, Warroad, Minnesota. Bemidji State University.

Fig. 3. W. Chaska Creek: Upland origin of diversion chanel; toward west.

Fig. 4. W. Chaska Creek: Current channelization.

Fig. 5. W. Chaska Creek: Impacted area at Hickory Street.

Fig. 6. W. Chaska Creek: Impacted area from Hickory Street toward west.

Fig. 7. W. Chaska Creek: Impacted area, view toward east.

Fig. 8. W. Chaska Creek: Flood plain, view toward south.

Fig. 9. W. Chaska Creek: Impacted area along railroad track.

Fig. 10. W. Chaska Creek: Impacted area behind recycling center.

Fig. 11. W. Chaska Creek: Impacted area in the small segment north of T.H. 212.

Fig. 12. Alternate #2: View toward west.

Fig. 13. Alternate #2: View toward northwest.

Fig. 14. Alternate #3: Impacted area west of County Road 7.

Fig. 15. Alternate #3: View toward east.

Fig. 16. Alternate #3: View southwest from 3rd terrace toward 2nd terrace.

Fig. 17. Alternate #3: Impacted area near the Gedney plant, view toward east.

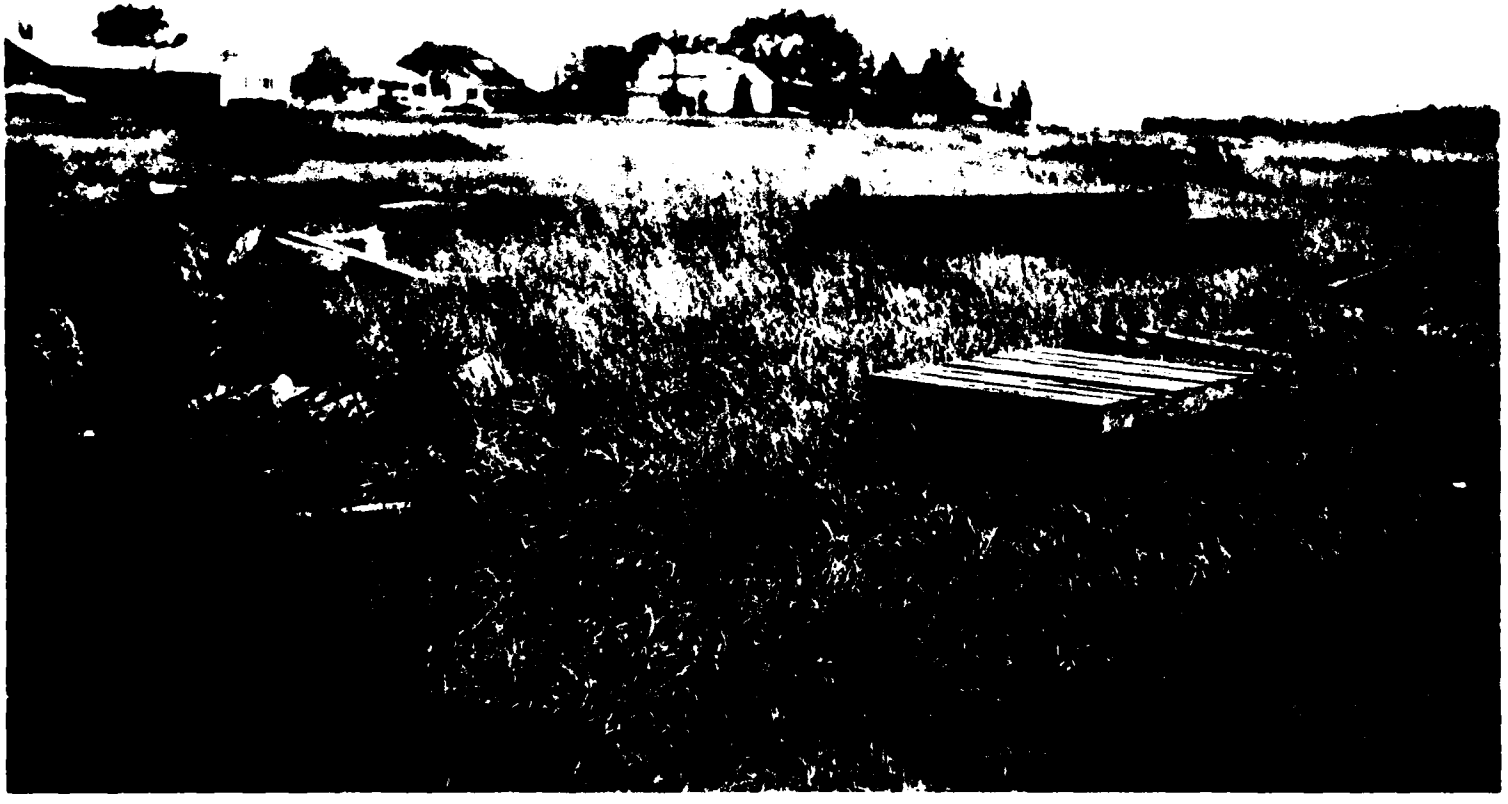


Fig. 18. Alternate #3: Impacted area near the Gedney plant, view toward west.

Fig. 19. Chaska area site locations.

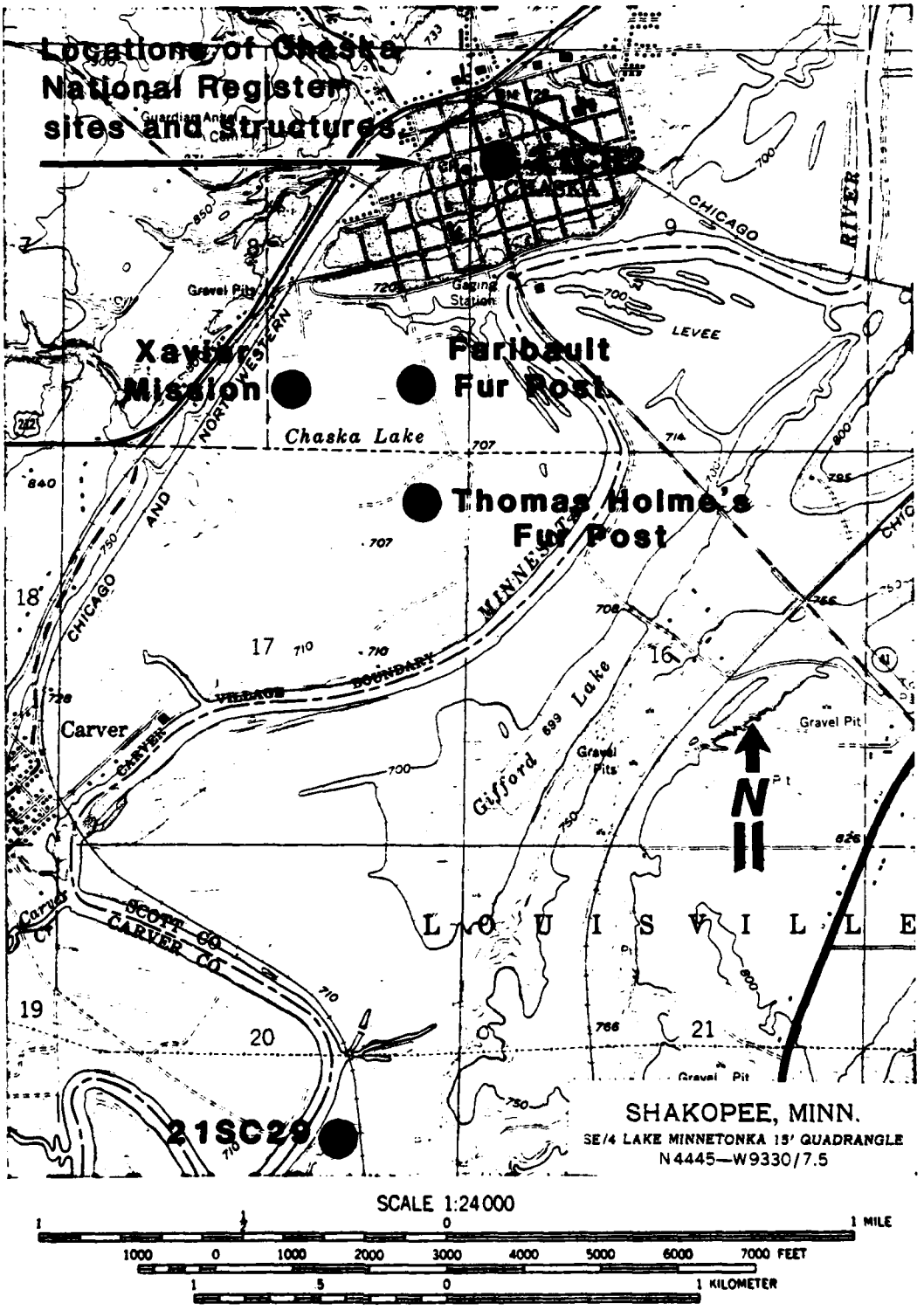


Fig. 20. Carver area site locations.

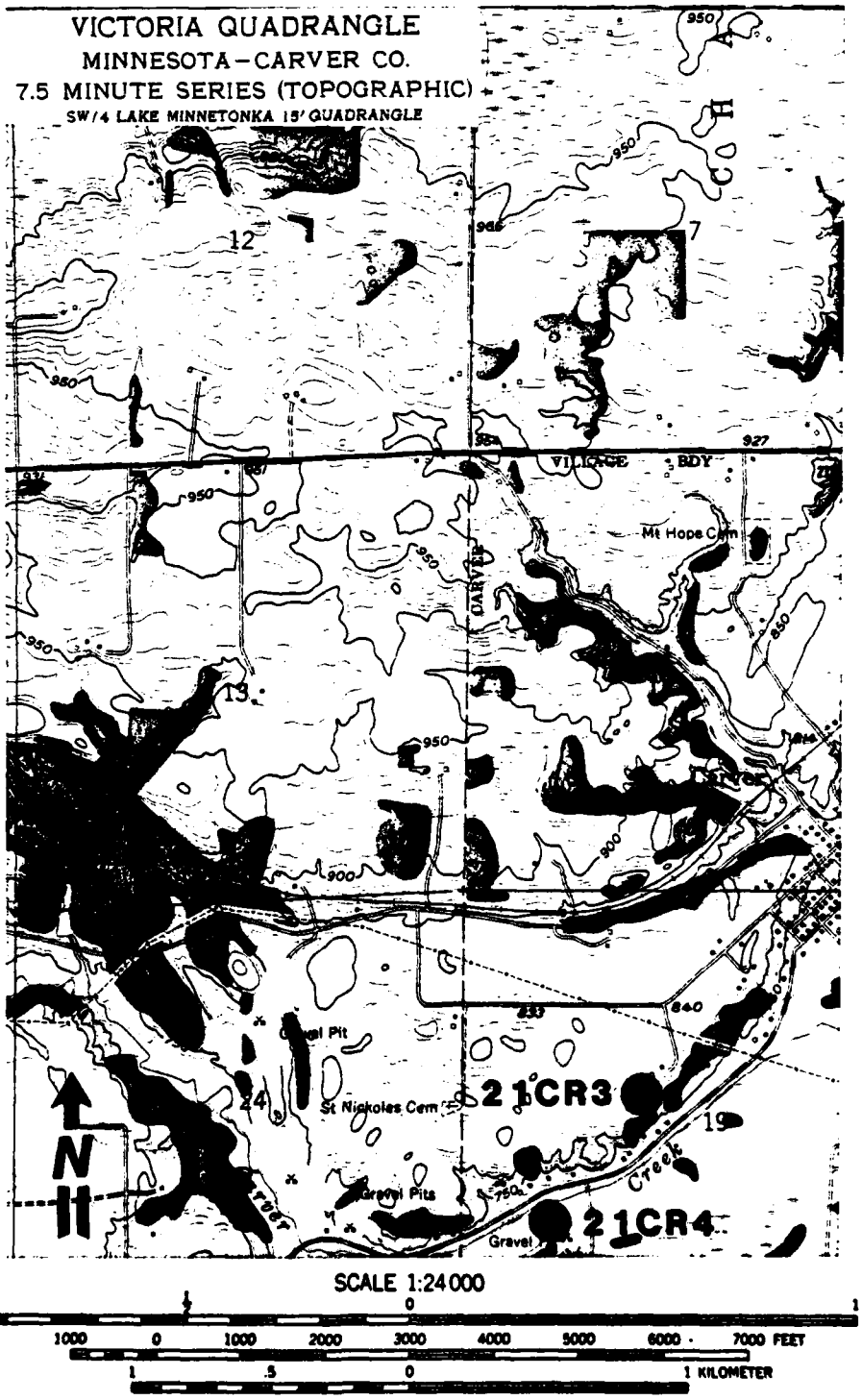
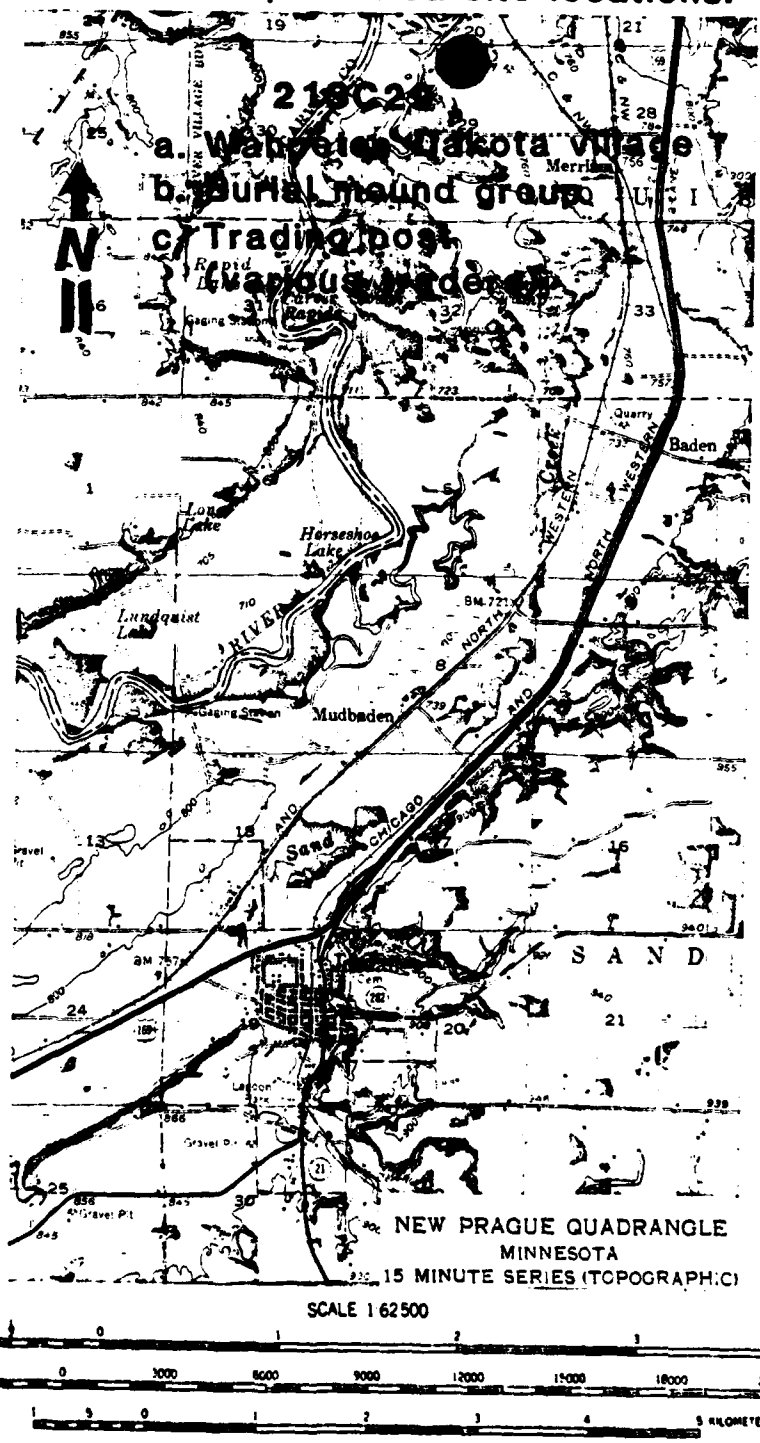
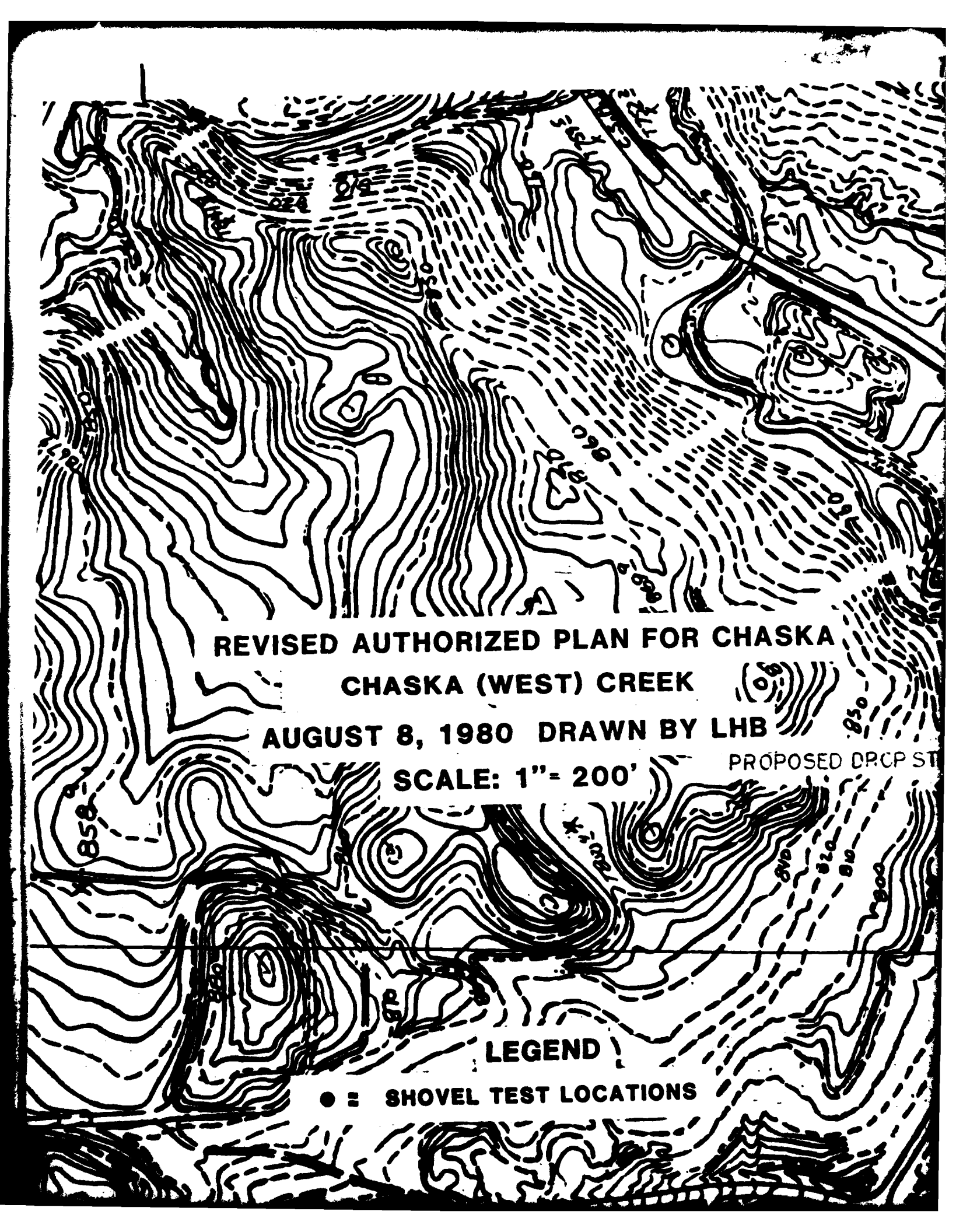
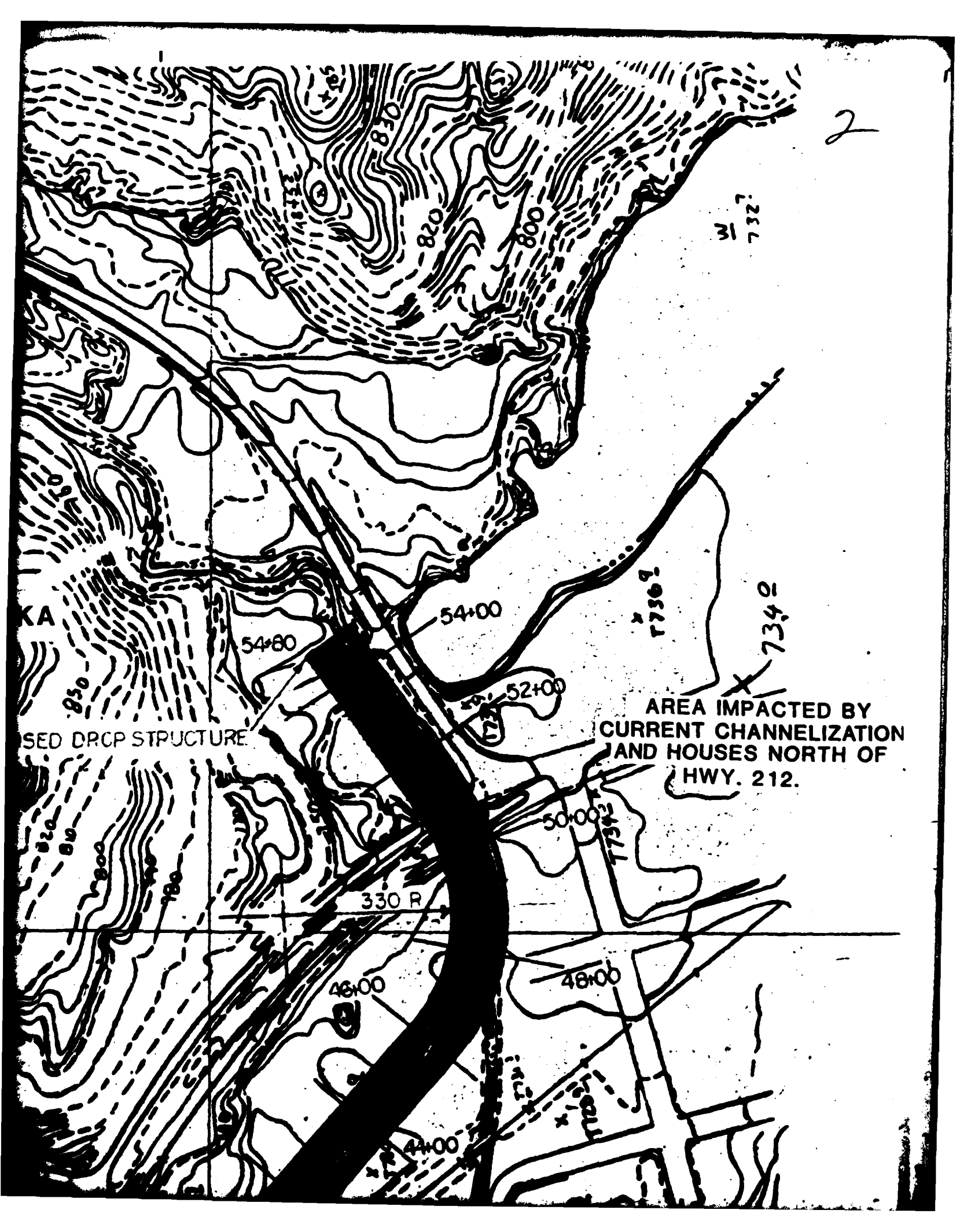


Fig. 21. Little Rapids area site locations.




REVISED AUTHORIZED PLAN FOR CHASKA
CHASKA (WEST) CREEK
AUGUST 8, 1980 DRAWN BY LHB
SCALE: 1"= 200'
PROPOSED DROP ST
LEGEND
● = SHOVEL TEST LOCATIONS


2
820
800
54+00
54+80
52+00
50+00
48+00
46+00
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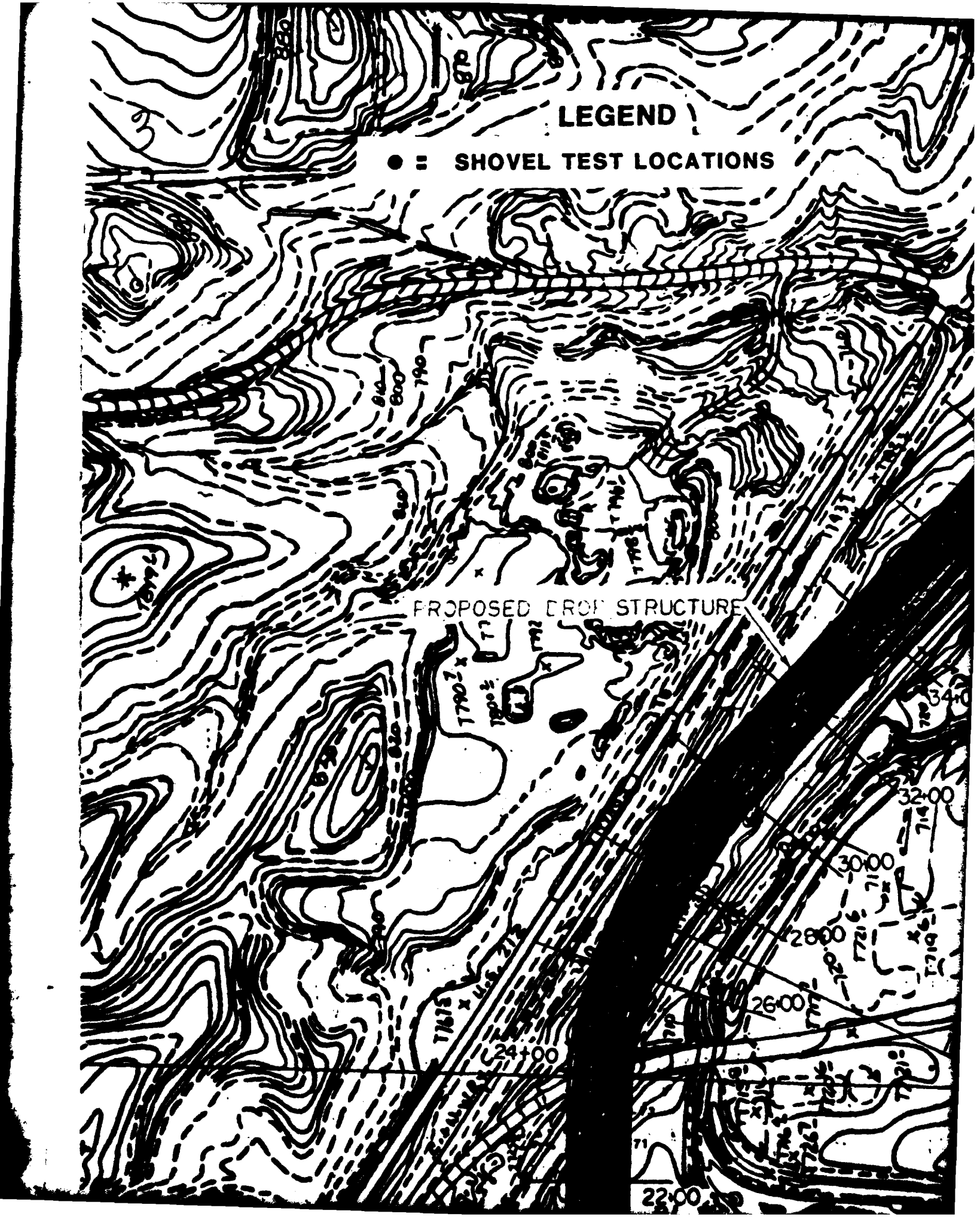
330 R
SED DROP STRUCTURE
AREA IMPACTED BY CURRENT CHANNELIZATION AND HOUSES NORTH OF HWY. 212.


LEGEND
● = SHOVEL TEST LOCATIONS
PROPOSED DROP STRUCTURE
34+00
32+00
30+00
28+00
26+00
24+00
22+00

330 R
50+00
48+00
48+00
44+00
42+00
40+00
38+00
36+00
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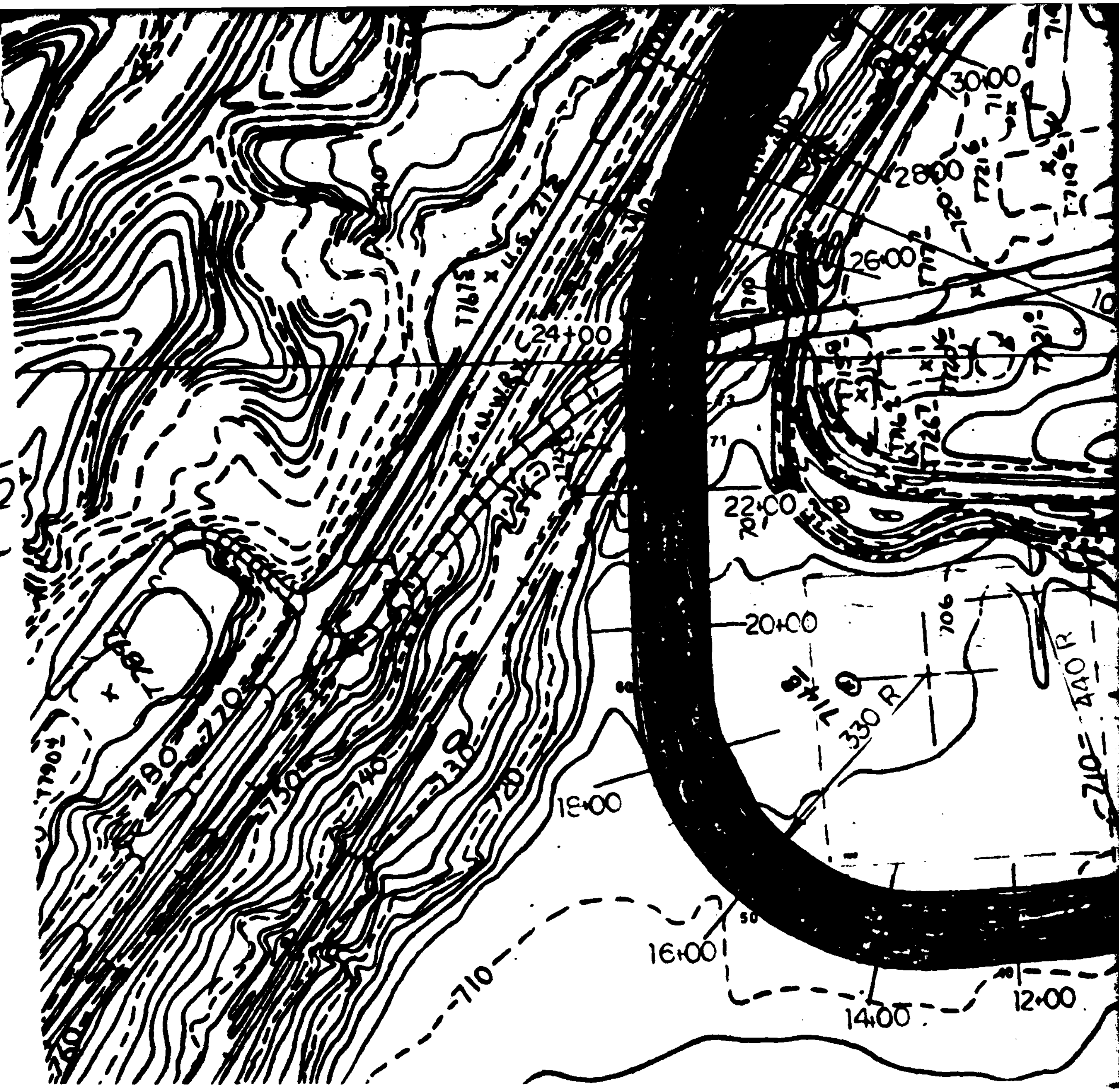
32+00
4



30+00
28+00
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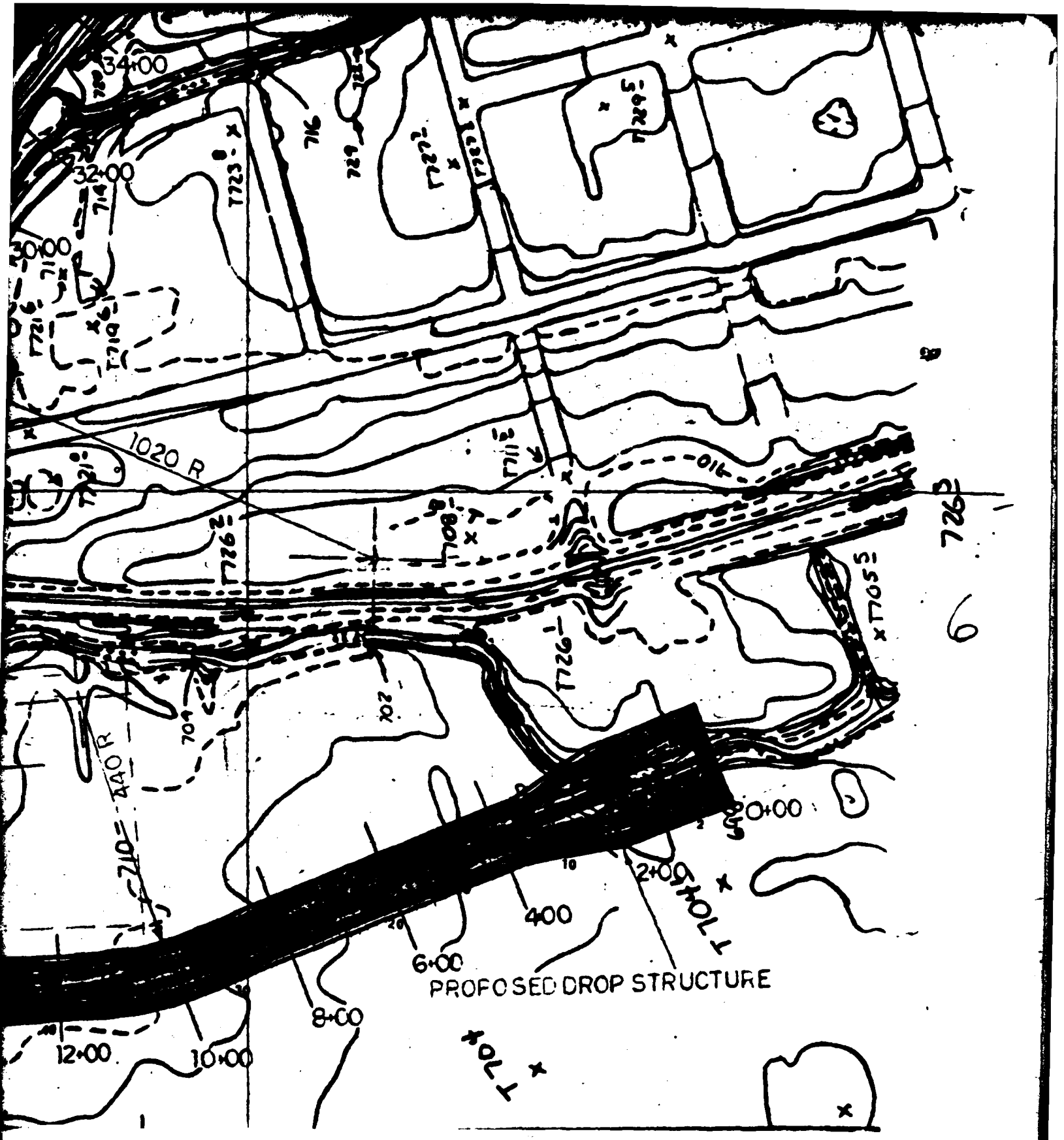
U.S. 212


34+00
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PROPOSED DROP STRUCTURE
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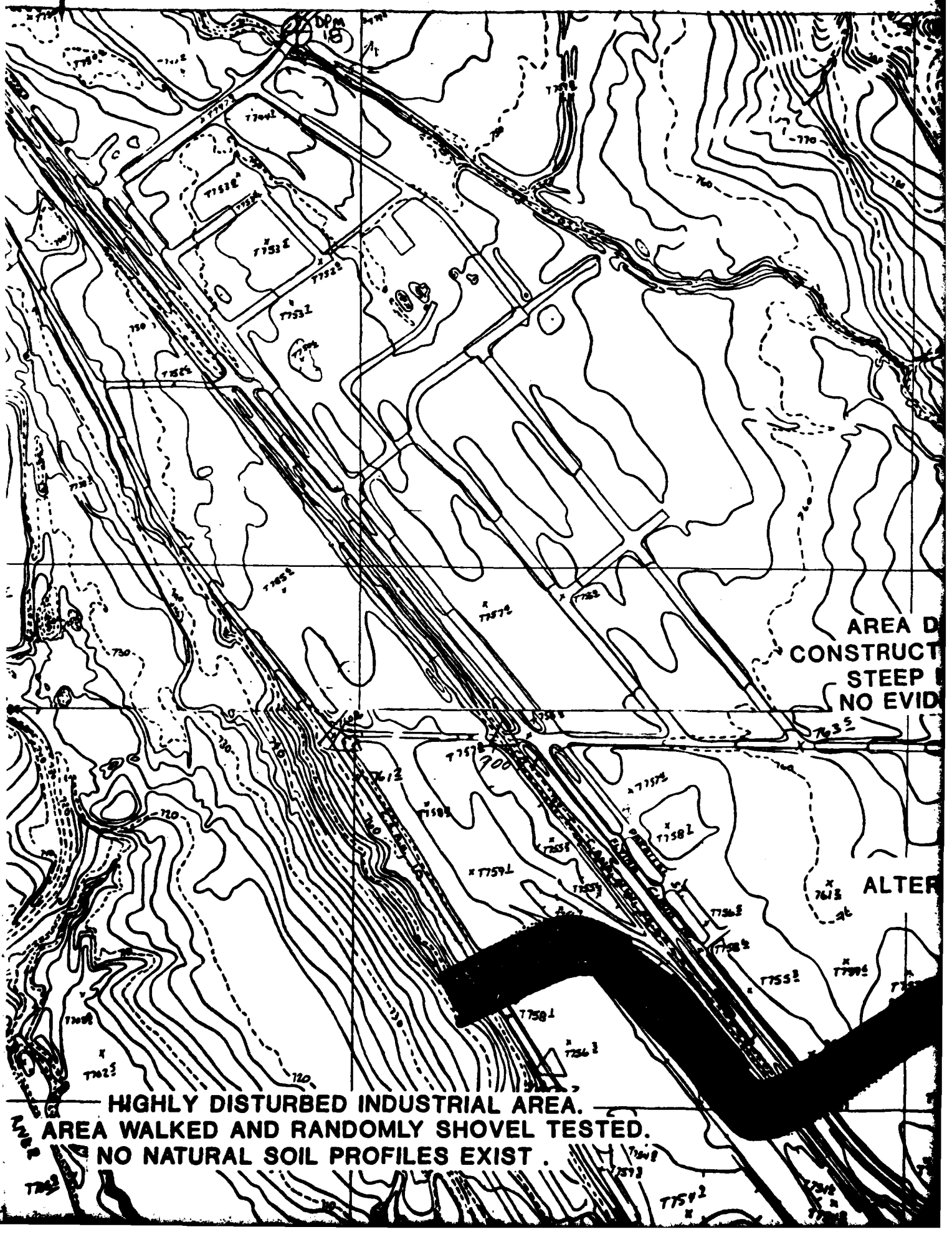
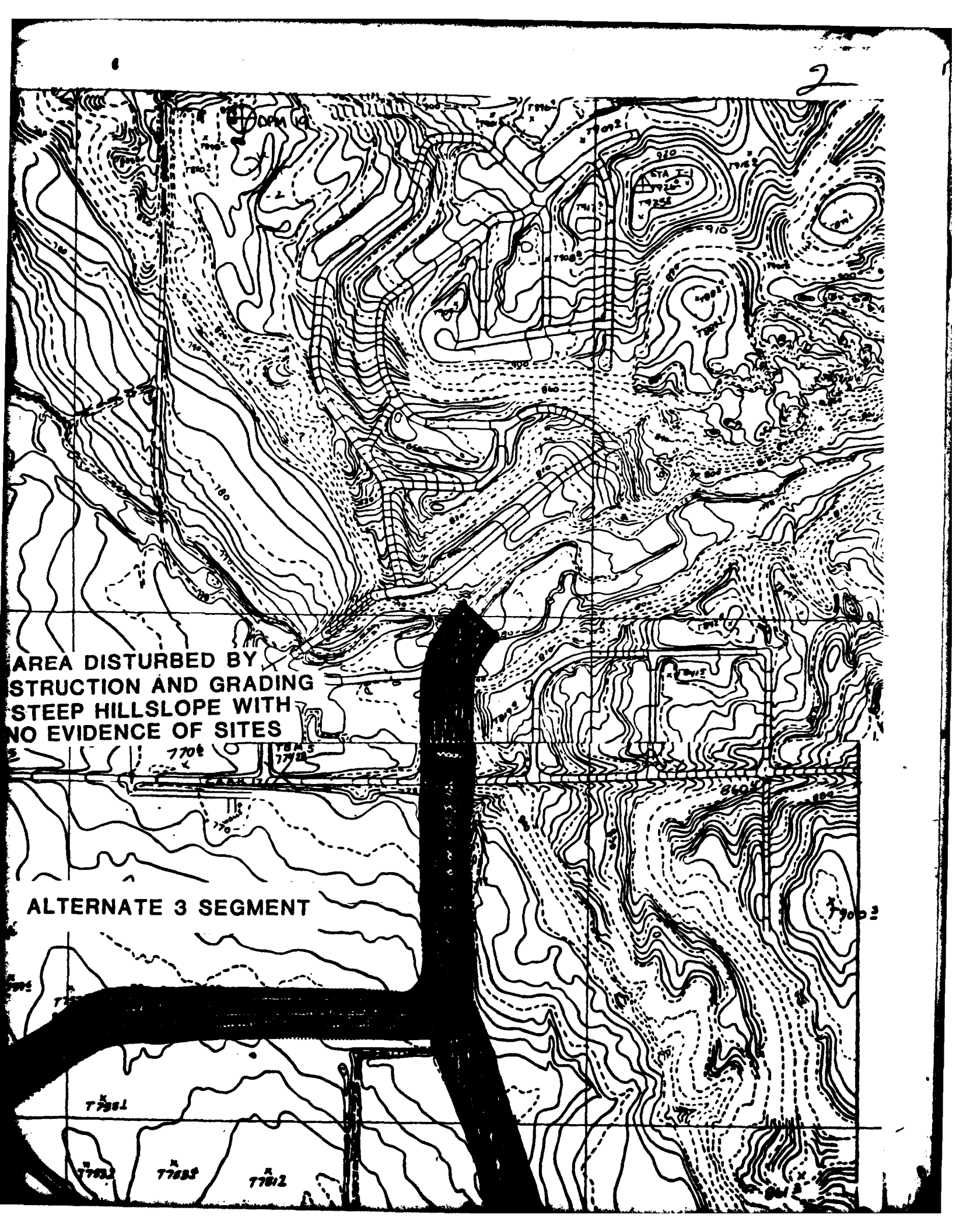
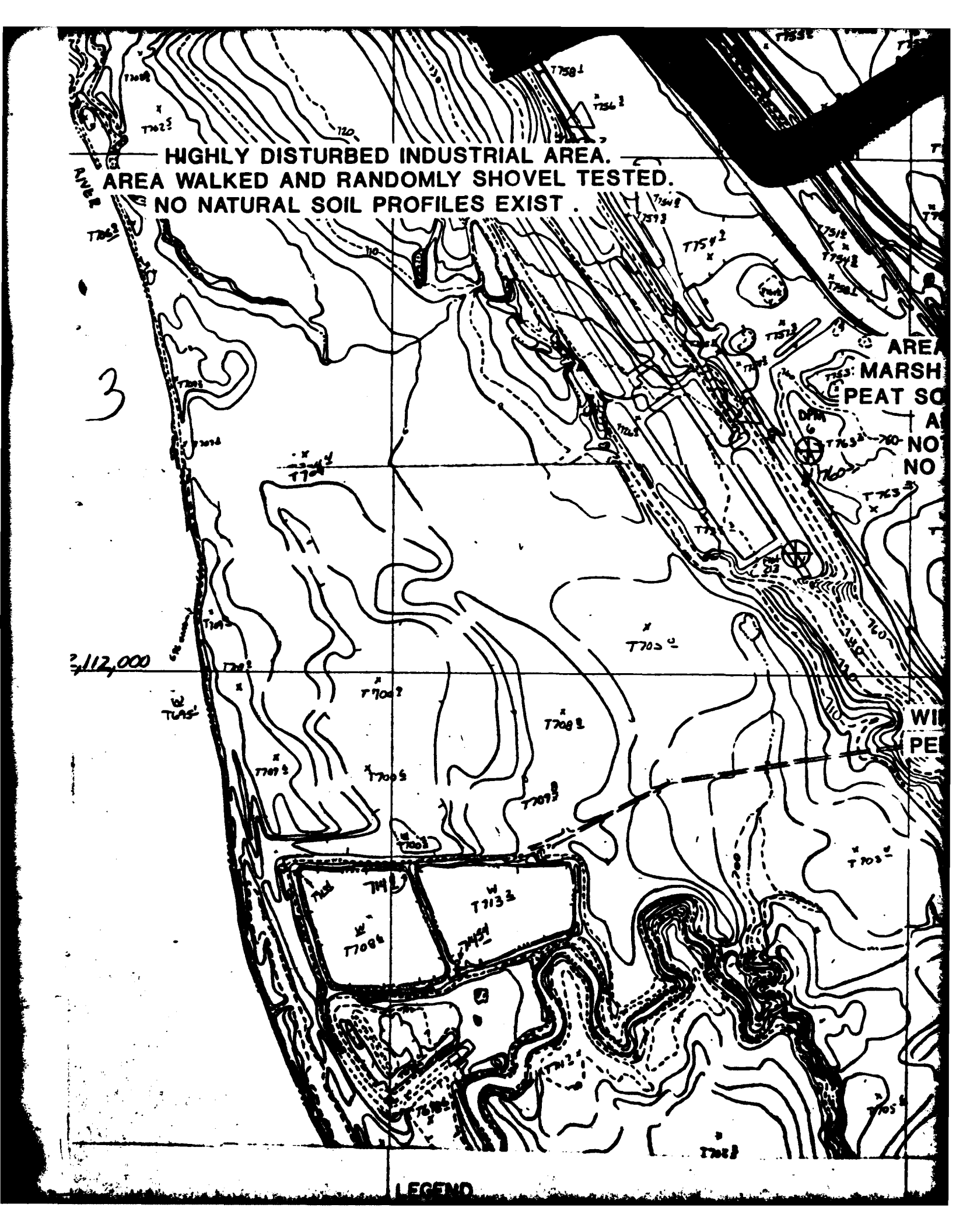
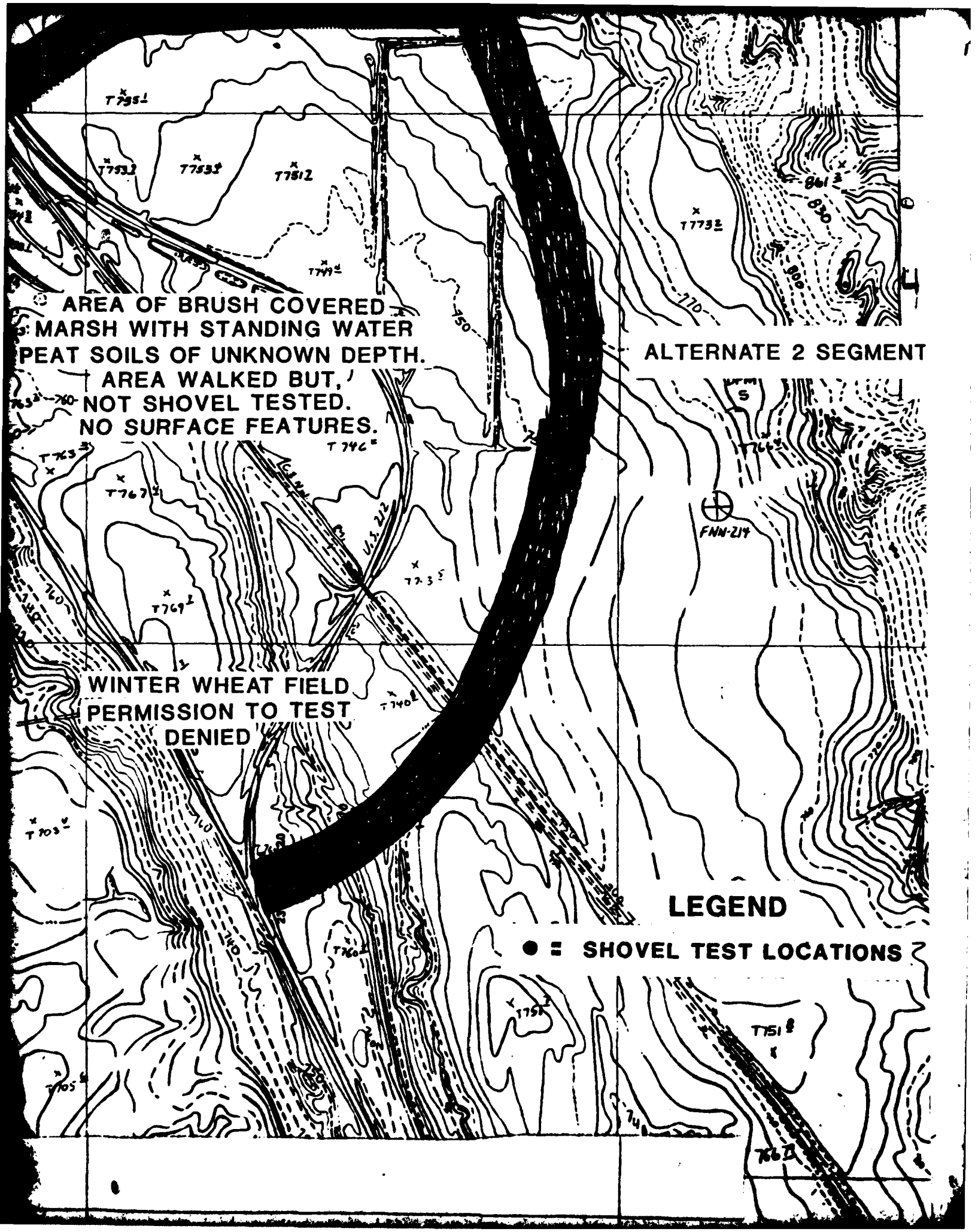
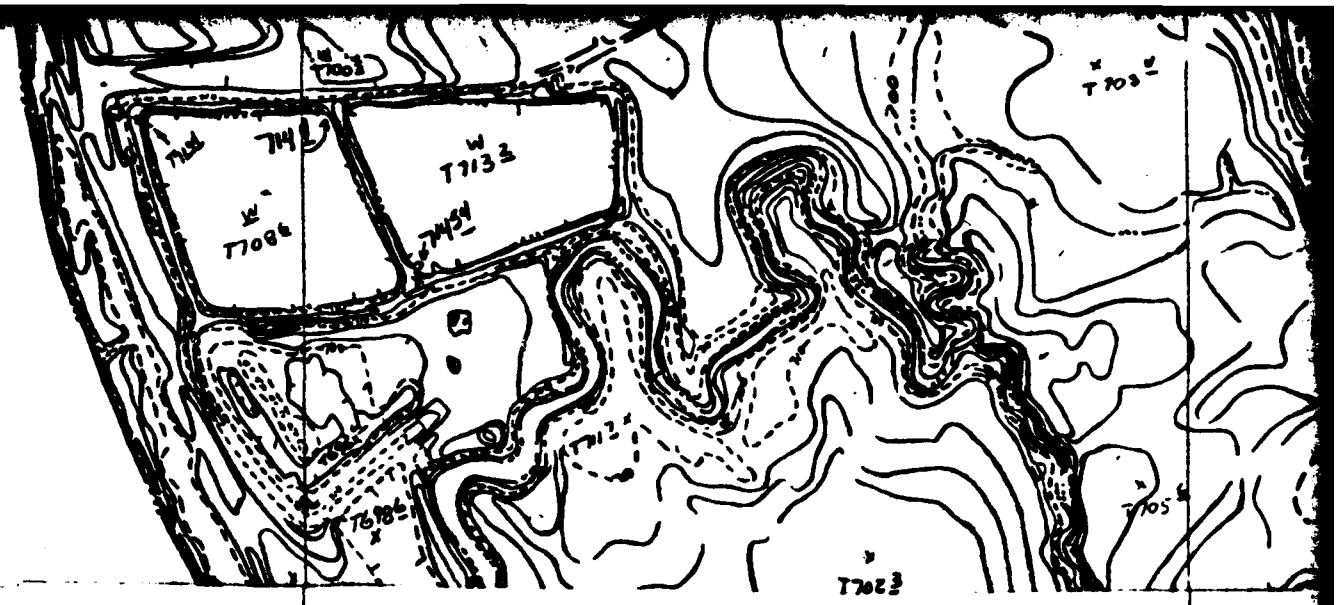

AREA D
CONSTRUCT
STEEP
NO EVID
ALTER
HIGHLY DISTURBED INDUSTRIAL AREA.
AREA WALKED AND RANDOMLY SHOVEL TESTED.
NO NATURAL SOIL PROFILES EXIST .


AREA DISTURBED BY
STRUCTION AND GRADING
STEEP HILLSLOPE WITH
NO EVIDENCE OF SITES
ALTERNATE 3 SEGMENT


HIGHLY DISTURBED INDUSTRIAL AREA.
AREA WALKED AND RANDOMLY SHOVEL TESTED.
NO NATURAL SOIL PROFILES EXIST .
3
MARSH
PEAT SO
NO
NO
112,000
LEGEND


AREA OF BRUSH COVERED MARSH WITH STANDING WATER PEAT SOILS OF UNKNOWN DEPTH.
AREA WALKED BUT, NOT SHOVEL TESTED. NO SURFACE FEATURES.
ALTERNATE 2 SEGMENT
WINTER WHEAT FIELD PERMISSION TO TEST DENIED
FNN-219
LEGEND
● = SHOVEL TEST LOCATIONS



5

LEGEND

- PRIMARY ROAD
- SECONDARY ROAD
- TRAIL
- BRIDGE
- RAILROAD
- FENCE
- BUILDING
- WALL
- UTILITY POLE
- DRAINAGE
- CULVERT
- LAKE OR POND
- SWAMP
- TREE
- WOODED AREA
- PHOTO CENTER
- HORIZONTAL CONTROL POINT
- BENCH MARK
- 893.3 FIELD SURVEY ELEVATION
- 7898.7 PLOTTER ELEVATION
- SECTION CORNER APPROXIMATE LOCATION
- 1/4 CORNER APPROXIMATE LOCATION

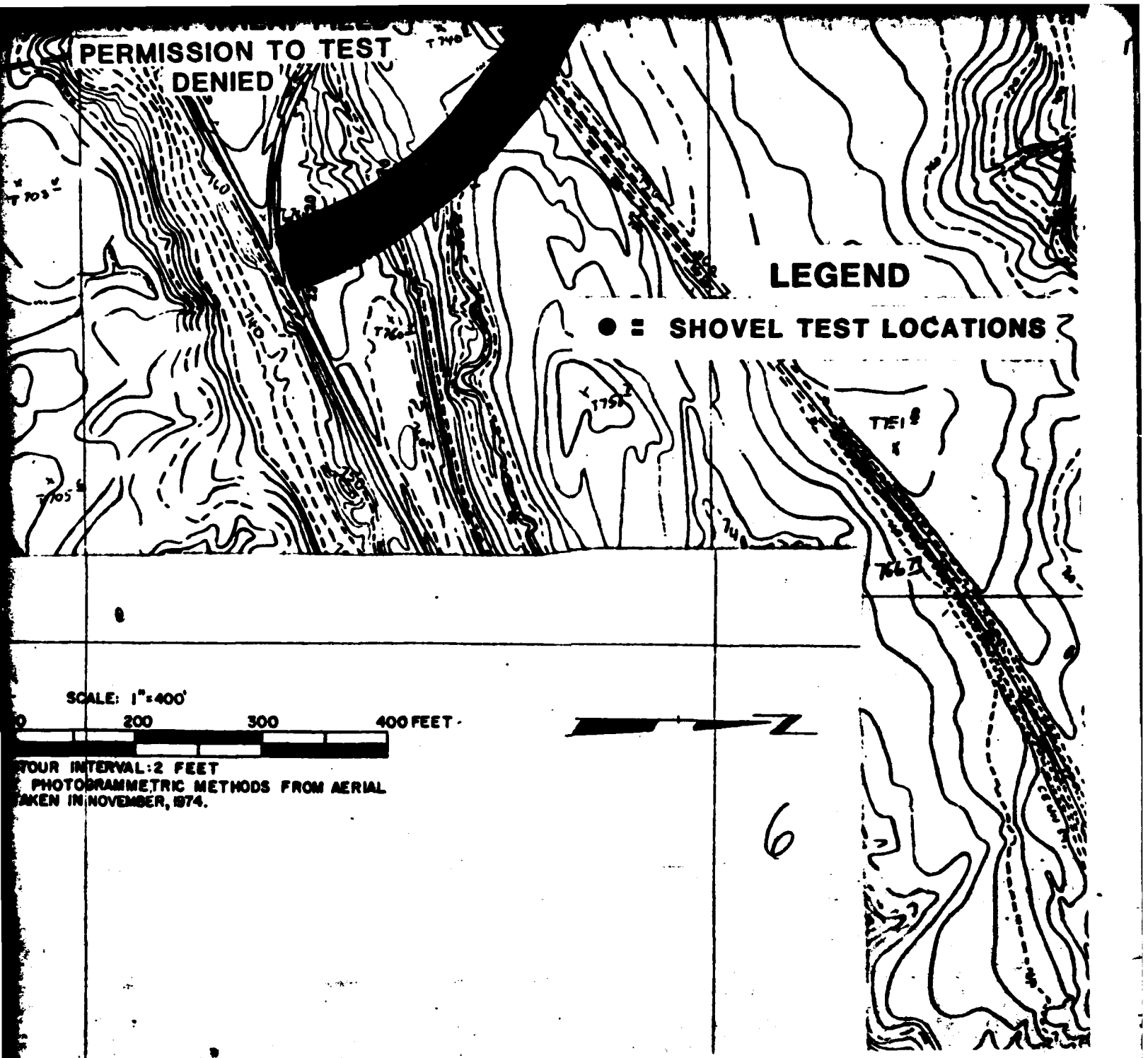
SCALE: 1"=40

0 50 100 200

CONTOUR INTERVAL: 2

TOPOGRAPHY BY PHOTOGRAMMETRI

PHOTOGRAPHS TAKEN IN NOVEMBER,


PERMISSION TO TEST
DENIED
LEGEND
● = SHOVEL TEST LOCATIONS
SCALE: 1"=400'
0
200
300
400 FEET
OUR INTERVAL: 2 FEET
PHOTOGRAMMETRIC METHODS FROM AERIAL
AKEN IN NOVEMBER, 1974.

6